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Analysis, Design and Development of a Sustainable Community Fire Station-Based Injury Control and Research Centre

By

John A. Sharma

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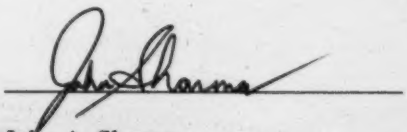

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"In creating, the only hard thing is to begin: a grass blade's no easier to make than an oak."

-- James Russell Lowell

"He who joyfully marches in rank and file has already earned my contempt. He has been given a large brain by mistake, since for him the spinal cord would suffice."

-- Albert Einstein

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **Analysis, Design and Development of A Sustainable Community Fire Station-Based Injury Control and Research Centre** submitted by **John Arjun Sharma** in partial fulfillment of the requirements for the degree of **Master of Science** in Medical Sciences – Public Health Sciences (Epidemiology).

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To my parents Nick and Rita, my brother Mitch,
my beloved uncle, Lt. Col. Sanjay Gaur, who recently passed away,
everyone who supported me over the last two years,
and of course, the "Big Guy" SSSB.

Abstract

The Regional Injury Control and Research Centre (RICRC) is the first community-based injury control and research center in Canada and the first center to be uniquely housed in a fire station providing both fire and pre-hospital emergency medical services in North America. The RICRC is intended to act as "the model center" for other communities wishing to address *injury control* through a focused, coordinated and scientific approach at the local level. This qualitative study utilizes observational, interview and document review data to address the Analysis, Design and Development phases of the Systems Approach that were used in the establishment of the RICRC in the County of Strathcona, Alberta. Ultimately, it is anticipated that with such "satellite" centers to the provincial center, the Alberta Centre for Injury Control and Research (ACICR), that a more structured and multi-sectoral effort to reduce the burden of injuries in our communities may be instituted.

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My heartfelt thanks to my dear family and friends who gave me their patience, support, and most of all, their love over the past two years.

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Confucius once said: "the journey of a thousand miles begins with a single step." This acknowledgement would not be complete without giving my humble thanks to God who has showered His blessings and given me the strength to endure, the patience to persist, the love to conquer and the motivation to take that first step.

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List of Abbreviations

AB	Alberta
ACICR	Alberta Centre for Injury Control and Research
ACIS	Alberta Collision Information System
AIDS	Acquired Immune Deficiency Syndrome
APHA	American Public Health Association
CAER	Community Awareness and Emergency Response
CDC	Centers for Disease Control and Prevention, Atlanta, Georgia, USA
CHC	Community Health Centers
CHIRPP	Canadian Hospitals Injury Reporting and Prevention Programs
CLB	Community Lottery Board
CNC	Community-based Nursing Centers
CPR	Cardio-Pulmonary Resuscitation
CQI	Continuous Quality Improvement
CVD	Cardiovascular Disease
DIDP	Dynamic Injury Data Program
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
ER	Emergency Room
ICEHS	Injury Control and Emergency Health Services
ICI	Injury Control Initiative
NCIPC[1]	National Centre for Injury Prevention and Control, Atlanta, Georgia, USA
NCIPC[2]	National Committee for Injury Prevention and Control
NHTSA	National Highway and Transportation Safety Administration
PAID	Parents Against Drunk Driving
PCR	Patient Care Report
PIP	Primary Injury Prevention
PYLL	Potential Years of Life Lost
RCMP	Royal Canadian Mounted Police
RICRC	Regional Injury Control and Research Centre
SCES	Strathcona County Emergency Services
SIA	Strathcona Industrial Association
STIPDA	State and Territorial Injury Prevention Directors' Association
US	United States

CHAPTER ONE

Introduction

1.1 Scope of Thesis

1.1.1 Goals and Objectives

This qualitative study identifies and describes the processes and events that are performed through the application of the Systems Approach, in the establishment of North America's first community fire station-based injury control and research center, the Regional Injury Control and Research Centre (RICRC); and how these processes and events contribute to the Centre being a sustainable entity in the community.

The Systems Approach (devised of five distinct phases) (Micik and Miclette, 1985; Gallagher, 1993) in this study will refer to *only* the first three phases – *Analysis*, *Design*, and *Development*. Therefore, the goal of this project was to investigate and describe the establishment of a community-based injury control and research center that:

1) is uniquely housed in a fire station; and
2) can be sustainable for the long-term.

Furthermore, the objectives of this study were as follows:

1) Design a conceptual framework for the Centre's overall establishment.
2) Identify the need for a community-based injury control and research center (*Analysis*).
3) Describe the environment (i.e., location and setting) in which the Centre will be established and it's intended function(s) (*Design*).

4) Describe the processes and events involved in the *Development* phase of the RICRC in the County of Strathcona, Alberta, the pilot site.

The findings of this present study will provide information that can:

1) help build on existing study conducted by Strome (1998) so that a state-of-the-art injury surveillance tool could be fully implemented and utilized;
2) help guide other communities in the Province of Alberta in establishing their own injury control and research center by providing a working model for establishment;
3) help other communities coordinate and strengthen injury control initiatives;
4) support the Alberta Centre for Injury Control and Research (ACICR) in meeting their mandate (Appendix I);
5) emphasize the supportive nature of the EMS component to injury control; and
6) help guide future RICRC coordinators in the Centre's Implementation and Evaluation phases (Systems Approach phases 4 and 5).

1.1.2 Basic Assumptions Underlying the Study.

The assumptions underlying the study are as follows:

- The establishment of the center will occur in three stages (I, II, and III) (refer Appendix I). The present study is only responsible for STAGE I. STAGES II and III are left for future studies.
- The fire station setting is just one solution. It is possible for injury control and research centers to be established in hospitals, health clinics, universities, etc.
- Community (i.e. County of Strathcona) is defined in terms of geographical boundaries.

1.2 Organization of Thesis

This thesis is comprised of four chapters, two of which are standalone papers targeted for the medical literature. The first chapter provides a literature review of areas specific to this study. Chapter Two, "Analysis and Design of a Sustainable Community Fire Station-based Injury Control and Research Center", is a paper targeted for publication in the *Journal of Epidemiology and Community Health*. The methodology and results from the *Analysis* and *Design* phases of the RICRC are presented in Chapter Two. Chapter Three, "Experiences from the Development of a Sustainable Community Fire Station-based Injury Control and Research Center", is a paper targeted for publication in *Qualitative Health Research*. Chapter Three describes the *Development* phase of the RICRC. Chapter four, "Conclusions and Future Directions", discusses the implications of this research, and explores how and what the RICRC can do to future phases of its existence.

1.3 Literature Review

A variety of general concepts regarding the burden of injury, injury control, and injury surveillance encompass this study. Appendix II provides a detailed discussion of these concepts.

This thesis outlines the analysis, design and development of a sustainable community fire station-based injury control and research center. To date, no published studies have been devoted to the design and development of injury control centers in Alberta or Canada. To this end, a review of the literature pertaining to six significant study related categories were conducted. The categories are:

- Epidemiology and Public Health;
- Qualitative Research;
- Systems Approach;
- Community level centers;
- Fire Stations and EMS;
- Injury Control and Research Centers.

The purpose of presenting the literature review in relation to these six categories is to establish the foundation on which the present study was conducted. The categories are presented systematically in a macro-level (Epidemiology and Public Health) to micro-level (Injury Control and Research Centers) fashion in order to facilitate the understanding of the support provided by existing literature to the present study.

1.3.1 Epidemiology and Public Health

According to Sharrer (1992), public health, as an integral area of preventive medicine – a branch of medicine that concentrates on keeping people well, involves those programs and activities directed at the *community level* that either benefit everyone (e.g., mandatory wearing of

seat belts) or benefit those individuals who are not currently under the care of a physician (e.g., categorical sexually transmitted disease clinics and large scale screening programs). Furthermore, the basis for public health action and the union of public health professions is the science of epidemiology (Sharrer, 1992). Through this science, epidemiologists can identify factors that cause disease or disease transmission, and prevent the spread communicable and non-communicable diseases and conditions. Thus, epidemiology plays a pivotal role in the control and prevention of injuries.

John Last, considered by some to have defined modern day epidemiology, provides a definition of epidemiology that has broadened with the scope of the discipline. In his *Dictionary of Epidemiology*, Last defines epidemiology as the "study of the distribution and determinants of health-related states or events in specified populations, and the ***application*** of this study to control health problems" (Last, 1995). Of particular importance in this definition is the phrase eluding to the *application to control health problems*. This phrase makes explicit the purpose of epidemiology – to promote, protect, and preserve good health.

There has been growing recognition that public health tools and methods used effectively against infectious and other diseases can also be applied to injury control. The National Center for Injury Prevention and Control (NCIPC[1]) is staffed by an interdisciplinary group of public health experts drawn from some of the traditional areas of public health expertise. These CDC (Centers for Disease Control and Prevention) experts point out that interventions designed to reduce the impact of injury, such as bicycle or motorcycle helmets, can be considered an injury "vaccine," making the vaccinated public more resistant to injury (Christoffel and Gallagher, 1999). As with any vaccine, its use must be fostered through a combination of education and legal requirements, and its impact must be measured through surveillance and epidemiological analyses. A result of this heightened public health awareness regarding injury is that preventive

interventions concentrate not only on individual victims, but also on the environment and on the products used by the public.

It is a well-known fact that failure in preventive activities usually makes it necessary to increase the expenditures in the therapeutical branch, and, consequently, inadequate therapy leads to further expenditures for rehabilitation, pensions, and public welfare (Kostrzewski, 1975). From the purely medical and socio-medical viewpoint, the most effective and least costly are the preventive activities; therapy is more expensive, and the greatest economic burden is connected with public welfare (Kostrzewski, 1975).

From a public health perspective, injury control should be a priority. The importance of gathering accurate and timely data on injuries for epidemiologic surveillance and research purposes, building community partnerships to reduce duplication of prevention efforts and maximizing on the coordination of injury control initiatives cannot be overemphasized. Epidemiologic surveillance is defined as, "the systematic collection, analysis, interpretation, and sharing of health data for the design, implementation, and evaluation of public health programs" (Langmuir, 1963). Currently, injury surveillance systems are being designed, and developed to better estimate the magnitude of the injury problem, to determine etiology and prevent the occurrence of injury. In fact, the basis of effective injury control and prevention is the collection and analysis of injury surveillance data information regarding injury incidence, demographics, severity cause, risk factors, treatments and outcomes. Despite the fact that surveillance is an essential component of injury prevention and treatment programs, injury data from up to 97% (Strome, 1998) of all injured people who require medical attention are not captured nor used. This failure to record and utilize injury surveillance data in comprehensive and accessible databases greatly limits the ability to evaluate the effectiveness of injury prevention, and treatment efforts. In Strome's (1998) design and development of a computerized emergency

medical services (EMS)-based surveillance system, epidemiology was involved in studying injury at different time periods and among different demographics of residents in a community. Ultimately, the field of epidemiology also encompasses the *application* (i.e. implementation and utilization of the injury data to direct prevention efforts) of this knowledge to the eventual control of injuries in the community, an aspect of the injury control system, according to Strome (1998), less executed (Ozanne-Smith and Williams, 1995). Exactly how this knowledge is applied to produce admirable results requires some imagination and innovation.

Epidemiology plays an important role in the public health services planning continuum. Epidemiology is a basic discipline for public health administrators and others concerned with either national or community health services, health planning, and evaluation of health programs (Kostrzewski, 1975). According to Kostrzewski (1975), one of the main aims of epidemiology is to provide the data essential to the *planning*, *implementation*, and *evaluation* of services for the prevention, control and treatment of disease, and to the establishment of priorities among those services. This would include information about the services themselves. Furthermore, the role of epidemiology and epidemiological philosophy in the planning of health services is related to the selection of goals and priorities. According to Kostrzewski (1975), it is relatively easy to express what a service or program (e.g. falls-related injuries) is aiming to achieve (e.g. reduction in falls-related injuries by 5% over one year), but much more difficult to describe the order in which all the components of a plan should receive attention and to ascribe a proper schedule (e.g. strategic plan) and time-scale (e.g. critical path) to the plan.

Runyan (1993) clearly indicates that there is "more to understanding injury problems than epidemiology alone can deliver; the problems are complex, and such an understanding requires many different kinds of information, both quantitative and qualitative."

1.3.2 Qualitative Research

Qualitative research is essentially descriptive in nature. It has often been advocated as the "best strategy for discovery" (Miles and Huberman, 1994). As opposed to quantitative research, which is a more deductive approach, qualitative research operates in an inductive fashion, seeking to expose the full social and/or cultural context of the issue under study. Qualitative research allows for more descriptive evaluations, or *assessments*, to be made. Runyan (1993) indicates that assessments should address not only concrete dimensions of the problems or issues but also the more "amorphous" concepts such as attitudes, beliefs, and perceptions. Runyan (1993) further elucidates that these types of information are not often collected by the many epidemiologists who prefer more crisply defined variables.

Qualitative research is conducted through an intense and/or prolonged contact with a "field" or life situation (Miles and Huberman, 1994). The role of the researcher, who is essentially the main "measurement device" in the study (Miles and Huberman, 1994), is to gain a "holistic" (systematic, encompassing, integrated) overview of the context under study: its logic, its arrangements, its explicit and implicit rules. In regards to sampling, Miles and Huberman (1994) indicate that qualitative research is usually performed by an individual or small group of researchers working with small samples of people who are "nested" in their context- unlike quantitative researchers, who aim for larger numbers of context-stripped cases and seek statistical significance. These qualitative samples tend to be *purposive*, rather than random (Miles and Huberman, 1994). Purposive or systematic sampling (Mays and Pope, 1996) is the deliberate choice of participants. Moreover, crucial to the success of qualitative studies is the identification of key informants (Rothe, 1993). Key informants are usually chosen because they possess or have access to important sources of knowledge relevant to the phenomena being studied. Furthermore, through data that is collected by various qualitative means, certain categories, themes and patterns may be constructed; because qualitative research is descriptive in nature,

most analysis is done with words. The words are based on observation, interviews, or documents, or in other words, "watching, asking, or examining" (Miles and Huberman, 1994).

According to Rothe (1993), qualitative research brings about an awareness that social issues are not entities frozen in statistical interpretations. Rather, they are public dramas, ambiguous in meaning, malleable over different situations and times. To that end, qualitative research can help explain why some problems are so hard to solve, and what can be done about them. Furthermore, it is through the process of qualitative analysis that gives rise to queries about what is going on, who benefits and who loses, who defines activities and whose perspectives on issues and appropriate behavior dominate (Rothe, 1993). Particularly, qualitative research attempts to provide information on questions such as how relationships are important in the progress of people doing things, and how people's orientations to, experiences of, beliefs about, and feelings on certain issues construct a phenomena. Rothe (1993) thus further emphasized that the need for qualitative research is too great to be dismissed or minimized as something marginal or novel.

Qualitative research is not just a generic research process. In fact, according to Rothe (1993), it is comprised of numerous orientations or dominant schools of thought, many of which inter-relate. Some of these orientations include ethnomethodology, phenomenology, and critical analysis. Certain points of reference lie at the heart of qualitative research and such orientations. For example, there is a recognition that reality is experienced by people and thus, there are as many versions of reality as there are people; and also, people engage in "minded activity" with reason and meaning and not because of a particular force, variable, factor, system or trait.

One orientation in particular, phenomenology, is especially utilized in qualitative research. Phenomenology reflects the assumption that people live in an ordered world (Rothe,

1993). According to Rothe (1993), the everyday world is a social reality comprised of cultural objects and social institutions and hence, the very commonplace, common sense, taken-for-granted features of the world lived in are the subject of research. To that end, phenomenologists try to penetrate the architecture of human thought and reveal the basic processes that underlie common sense. Researchers using a phenomenological approach recognize that people's consciousness is always a consciousness "of" something (Rothe, 1993; Morris, 1977). In other words, people have a reason for acting as they do. *In-order-to* and *because-of* motives are featured as the content of meaning. Simply described, *in-order-to* motive involves a measure of planning on how a goal is to be achieved and it usually reflects a person's experiences (Morris, 1977). On the other hand, with *because-of* motives, meaning is generated by an already experienced event. The most common research procedures phenomenologists use to unravel research questions are document analyses, observations, interviews and analysis of video and audiotape recordings.

"Subjectivity" is apparent in all the human activity that shows rudiments of consciousness and intentionality. "Intersubjectivity" involves acting to tune that subjectivity into that of other people. Thus, it is about understanding the existence of similar states in others and engaging with them in ways that are informed by that understanding. Furthermore, effective communication depends on the capacity to create and invest in shared reference. The skillful management of shared reference depends upon anticipating and interpreting the beliefs, motives and intentions of the people we are communicating with. To that end, phenomenologists highlight the conditions that account for interpersonally shared meanings such as those found within institutions, how meanings reflect action and interaction during the "here-and-now" in which they occur, and what kind of knowledge is used in the action (Rothe, 1993). Researchers begin their pursuit with the assumption that people experience the world not as a private one, but as an intersubjective world

that is common to all people (Schutz, 1971). They wonder how people's experiences provided them with a stock of knowledge that is socially distributed and differs among individuals.

Ultimately, uncovering the meanings, perspectives, and motivations behind individuals' experiences, behaviors and actions involves approaches beyond the limits of quantitative epidemiological research. Qualitative research, with its many orientations and schools of thought, provides one such approach to explain a particular sense of reality experienced by people.

1.3.3 Systems Approach

"Injury control demands a Systems Approach because of the very nature of the multiple, concurrent actions that must be taken together by both individuals and agencies" (Micik et al, 1987). To that end, there are many documented cases of injury control planning and program initiatives utilizing the Systems Approach (Micik and Miclette, 1985; Gallagher et al., 1993; Gielen and Collins, 1993; Boyd et al. 1983). Gallagher (1993) acknowledges that this "broad-based" approach is cited as particularly necessary for a problem as complex as unintentional injuries and violence.

According to Micik and Miclette (1985), injury prevention requires a coordinated political, medical, individual, and community effort to effect change in injury incidence and its associated mortality and morbidity. The Systems Approach is utilized so that the efforts of each agency and individual involved are directed toward achieving the overall goals of the initiative or program. Similarly, Gielen and Collins (1993) also advocated that injury prevention required a Systems Approach bringing to bear technological, legislative, and behavioral interventions. They further acknowledge that community-based action is considered critical to such an approach.

The Systems Approach consists of five phases that are described in Table 1.1.

Table 1.1- Systems Approach

Phase	*Purpose*
Analysis	The problem is defined, the need to solve it is established, and an overall goal is determined.
Design	Target populations and injuries are identified and described through the collection of additional information, and strategies are considered and selected.
Development	The key decision- makers are identified, commitments obtained, roles defined, intervention strategies revised, protocols established and tools (materials, legislation, etc.) created.
Implementation	The designated agencies and individuals implement the program(s) utilizing the tools and system protocols.
Evaluation	The markers used to evaluate implementation and outcomes are determined, evaluation is accomplished, and the program is revised.

Adapted from Micik and Miclette, 1985

Generally, the Systems Approach steps are: 1) setting objectives; 2) designing the means to achieve these objectives; and 3) constructing a feedback mechanism to determine progress toward, and attainment of, the objectives. Its basic paradigm is: input ⟶ processing ⟶ output, where input is the analysis, design and development phase, processing is the implementation phase; and output is the evaluation phase. Paradoxically, this is a sequence that actually is designed in reverse order. First, it is determined what the system must accomplish (i.e., the output); second, all the intermediate steps to accomplish this outcome must be programmed/implemented; and lastly, all the necessary ingredients to be fed into the system must be determined (i.e., the input) (Isaac and Michael, 1981).

The National Committee for Injury Prevention and Control (NCIPC[2]) (1989), the lead agency, maintained that in using a Systems Approach, they could collaborate with others to define common goals and a common language with which to understand and control injuries. The Committee indicated that the Systems Approach process included using data to *define* the local injury problem, collaboration with others to *design* and *develop* a program(s) based on these findings, selecting a mix of interventions to *implement* that reflects the state-of-the-art in injury

control, and *evaluating* the program's achievement of process and outcome objectives (NCIPC[2], 1989).

Though there may not be documented cases of established community fire station-based injury control and research centers using the Systems Approach to date, the existing literature does provide two important things. The literature provides: (1) support on the efficacy and effectiveness of community level centers in other health-related areas, and (2) also provides the basis for setting up an injury control center in a fire station that works as an extension of existing pre-hospital emergency medical services.

1.3.4 Community Action Approach and Community Level Centers

A "community action approach" (British Columbia Ministry of Health, 1998) focuses on solving community problems through partnerships with organizations and agencies, and local decision making. Leadership for initiatives can come from interested community members, business, industry, local government or professionals. The key to a community action approach is that it focuses on the strengths, skills, and problems solving capacities of local residents, organizations and institutions as a means to address specific issues that affect the health of a community. The community action approach involves people who have experience with an issue (e.g., EMS and injuries), and other interested members of the community (e.g., police, health units, Safe Community Coalitions, etc.), in identifying problems, implementing appropriate actions to solve them and/or advocating for change.

Community action approaches in other health related areas have shown to be beneficial. Some of the most widely recognized work relating to effecting change at the community level through community-based intervention has been done in the area of cardiovascular (CV) disease prevention, specifically, the North Karelia Project in Finland, Stanford Three Community Study

and the Five City Project, Minnesota Heart Health Program, and Pawtucket Heart Health Program in Rhode Island (Gielen and Collins, 1993; Shea and Basch, 1990; Shea et al., 1990). These programs were grounded in a primary prevention strategy that sought to reduce CV risk factors (smoking, high blood pressure, cholesterol, obesity, physical fitness) in whole populations. Various methods of delivering prevention messages were delivered such as mass media campaigns, school-based educational programs for children and parents, and health professional training (Gielen and Collins, 1993). Findings from more than 15 years of experience have provided strong evidence of the ability of these community intervention programs to affect the prevalence of major CV risk factors and, in at least one project (North Karelia), the actual heart disease mortality (Gielen and Collins, 1993; Shea and Basch, 1990). From an epidemiological perspective, there is reason to believe that the community approach to CV disease is applicable to injury control and prevention (Gielen and Collins, 1993). For example, the increases in the use of both child restraint devices and seat belts that have been observed during the past decade among the general population, as opposed to targeted high risk groups, have been associated with reductions in population death rates and serious injury rates (Baker et al., 1992). In addition, many of the risk factors for injury, like those for CV disease, take place in a social context, and the community itself becomes a system of influence (Gielen and Collins, 1993; Simons-Morton et al., 1989; Chamberlin, 1988; Holder and Giesbrecht, 1989; Putnam, 1989). Lastly, as Farquhar and Fortmann (1990) note from their experiences with the CV disease programs, "community interventions are able to affect individuals directly through education and indirectly through social and environmental changes, leading to the potential for synergistic interactions among components of the intervention."

Wright (1998) conducted a qualitative single-case study analyzing the implementation of a school-based community program utilizing the "Beacon model." The "Beacon model" was developed to provide children and youth with needed community services and transform public

schools into neighborhood centers of opportunity, service, and safety for entire families. Beacons are school-based community centers, managed by non-profit community-based organizations. It is through collaborative partnerships between the lead agency, Department of Youth Services, other local providers, the public school, and the community itself, that Beacons can offer a wide range of services to youth and their families (Wright, 1998). The Beacons were found to offer many programs and services, and ultimately, provided a "safe haven" for youth and adults to meet many needs and develop various competencies.

Documented studies on community level trauma centers, community-based nursing centers (CNCs), and community health and child health centers demonstrate that community level centers can be and are efficacious and effective. In 1979, a study in California concluded that San Francisco County, with its recognized trauma facility, offered trauma victims better care than did Orange County, which did not have a trauma facility (Cales, 1984). As a result, Orange County did later develop and implement a regional trauma facility that also proved to be effective in improving trauma care and reducing the death rate from vehicular trauma. Specifically, the results indicated that following full implementation of the facility, the proportion of potentially salvageable deaths dropped from 34% (20/58) to 15% (9/60) ($P<.02$) (Cales, 1984). Thus, Cales study "demonstrated that the trauma victim's best chance for survival occurs with treatment in the regional trauma [facility]" (Cales, 1984).

CNCs can contribute significantly to the effectiveness and efficiency of managed care networks. The CNC is designed to meet the changing needs and interests of a community (Ruka et al, 1997). The Silver Spring CNC is one example of a community nursing center that has demonstrated the ability to positively affect both the process and outcome of care for users from an urban community in Milwaukee (Lundeen, 1997). The CNC is effective in providing a comprehensive scope of services in regards to health care. Some of the services included:

problem assessment, minor illness treatment, referring patients for differential diagnoses, providing health screening, and prescribing of pharmacological agents and non-pharmacological therapies. The Silver Spring CNC has carefully developed missions and goals, and a conceptual framework upon which to further build the CNC model. Integral to the CNC model is the importance placed on improving the health and well being of urban communities through community coordination and collaboration. Lundeen's study indicates that effective partnerships are imperative within the health care delivery system and across human institutions. The emphasis on collaboration, coordination, and continuity in the development and provision of heath services has been the hallmark of the Silver Spring CNC (Lundeen, 1997). According to Ruka et al (1997), like the healthcare system, health education efforts in the community are fragmented and hence, need to be addressed in a coordinated approach in regards to the planning and delivery of an area's health education. Furthermore, Ruka et al (1997) also indicate the importance of the community level approach in that the trend by the state of New Hampshire is to encourage community integration because community projects that demonstrate unity and collaboration are the only projects that receive funding. Overall, this study revealed that CNCs collaborating with existing healthcare agencies had fostered acceptance and demonstrated validity (Ruka et al, 1997).

In regards to community health centers (CHCs), Morey et al. (1980) describe the structure, function and philosophy of a CHC developed by the Royal Prince Alfred Hospital, Sydney. Its development represented a new approach in community service organization in several ways. One of those ways was that it took a comprehensive approach to community needs in that its target population was defined by geographical boundaries, rather than by age, financial status, or nature of problem to be solved. The other way was that by providing a variety of professionals with different resources, it aimed to adapt its services to meet local community needs and demands and to complement existing services rather than to function as an independent

and self-sufficient unit (Morey et al, 1980). As they were important to CNCs, partnerships were important for the CHC and were established from the onset with other community groups and agencies.

Lastly, community-level child health centers were developed to address the need for a move towards prevention rather than the traditional curative approach provided by hospitals. Innes' (1979) study indicated that as more money is spent on super technology and on the services that treat the sick, little effort is made to rationalize the need for resources and to coordinate services towards prevention and health systems agencies. The study further indicated that community partners' involvement must be pursued so that the community perceives that the community resources are developed in terms of community needs rather than those of the health center alone (Innes, 1979). This center also plays a vital role in measuring health status. According to Innes (1979), there has been little success in measuring the outcome of efforts to change the health status of communities. The data simply measures the rate of sickness that is treated. However, by combining prevention and the epidemiological approach through the center, it provides a basis for analysis of outcomes and evaluation of changes in the health status of the community. Then, the health center directly relates to the community and its needs (Innes, 1979).

1.3.5 Fire Stations and EMS

Some fire stations, such as the one used to house the RICRC, the Strathcona County Emergency Services (SCES) department, are unique in that they offer both fire and emergency medical services (EMS) that are pre-hospital in nature. One component of injury control is EMS. According to the Strathcona County Fire Chief and Manager of Disaster Services, approximately 80% of all SCES 9-1-1 emergency calls to which the emergency services of either fire or EMS are required are in fact, medically related (20% fire-related). The EMS system consists of those

organizations, resources and individuals from whom some action is required to ensure a timely and medically appropriate response to medical emergencies (Osbaldeston, 1998). Thus, EMS plays a vital role in injury control as they are usually the first persons to arrive at scenes where medical attention is required. Furthermore, this time at which EMS personnel arrive and attend to a person requiring medical attention is often referred to as the "golden hour"; and consequently, much of the injury-related data that can be collected at the scene is often not captured (Strome, 1998). The information that could be collected at these scenes play a vital role in preventing injuries from occurring in the first place, otherwise called primary injury prevention (PIP).

Individual health care providers are realizing that primary prevention is an effective way to reduce health care costs and to improve overall wellness. Similarly, through their successful efforts aimed at preventing fires and burns and driving while intoxicated, fire departments have demonstrated that primary prevention is an essential public safety service (Garrison et al., 1997). Primary prevention is also a fundamental public health activity. To that end, EMS is unique in that its role involves individual health care, public safety, and public health. This combined role for EMS necessitates that all EMS organizations and individual providers, in an effort to fulfill their mission to reduce human suffering and economic loss resulting from premature death and disability, integrate PIP activities into their service. Furthermore, an overriding goal for all EMS organizations should be the creation and maintenance of a culture of health promotion and safety in their communities. To accomplish this, Garrison et al. (1997) state that EMS organizations *must* commit to PIP. Also, they point out that EMS organizations should join with other stakeholders in their community working for the prevention of injury. Spaite et al. (1997) refers to EMS in regards to such a change in emphasis from practice to service as "expanded-scope EMS." Emphasis in the EMS with an expanded scope of services would be placed on services such as prevention, public education, and public safety. An important point that Spaite et al.

(1997) make, and one that is integral to the present study, is that as the scope of service expands, there should be a "search for arenas that are a logical extension of what EMS currently does."

Garrison et al. (1997) further indicate that besides being a "natural" duty for EMS because of its combined individual health care, public safety, and public health roles, there are other reasons why EMS should be involved in PIP. For example: 1) EMS providers are widely distributed among the population; 2) EMS providers reflect the composition of the community; and 3) EMS providers generally enjoy high credibility within varying communities.

The importance of EMS becoming more involved in primary injury prevention efforts in the community is best described by the National Highway and Traffic Safety Administration (NHTSA). According to NHTSA, the EMS of the future will be community-based health management that is fully integrated with the overall health care system. It will have the "ability to identify and modify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to treatment of chronic conditions and community health monitoring" (US Department of Transportation, 1996). This new entity will be integrated with other health care providers and public health and public safety agencies. Furthermore, EMS is viewed as a standard, valuable community resource that must always be in place. For this reason, NHTSA is determined that the aforementioned functionality of EMS will improve community health and result in more appropriate use of acute health care resources. Moreover, to realize this vision of the EMS of the future, NHTSA proposed continued development of various EMS attributes such as EMS research, integration of health services, public education, prevention, communication systems, and information systems to name a few. Three of these attributes, EMS research, integration of health services and information systems, are particularly important to primary injury prevention. First, in regards to EMS research, significant barriers to collecting relevant, meaningful, and accurate EMS data exist (Spaite et al, 1993). Similar to the Canadian

experience, NHTSA explicates that EMS data often are not collected in a rigorous fashion that allows *academic evaluation*. Specifically, linkage with hospital and other data sets, which is required to determine EMS effectiveness, is difficult and infrequently accomplished. Such appropriately collected data is required to design and implement effective prevention initiatives. Second, EMS should integrate with other health system components to improve its care for the entire community, including children, the elderly, those who are chronically dependent on medical devices, and others to ultimately ensure that the population is better served, and that the special needs of specific patients are addressed adequately. Moreover, EMS must expand its public health role and develop ongoing relationships with community public health and social services resources. Such relationships should result in systems of communication that enable referrals and subsequent follow-up by those agencies. Relationships should benefit all parties by improved understanding of factors contributing to injury morbidity and mortality issues being addressed so as to establish injury prevention initiatives that prove beneficial to the whole community. To that end, EMS must become involved in the business of community health monitoring, including participation in data collection. Third, NHTSA indicated that a lack of information systems that are integrated with EMS and other health care providers and community resources severely limits the ability to share useful data. To that end, NHTSA recommended that EMS should collaborate with other health care resources to develop integrated information systems. Such efforts should provide each participant with patient-related data that potentially affects the continuum of care, facilitates access for patients to appropriate care and attention, enhances clinical care decision making, and facilitates follow-up care. Ultimately, a community-based injury control center, such as the RICRC, can help EMS develop such attributes thus emphasizing the Centre as a logical extension of EMS.

The health system of today, with its emphasis on advanced technology and costly acute interventions to promote societal health, is transitioning to focus on the early identification and

modifications of risk factors before illness or injury strikes. This transition will lead to a more cost-effective medical management system and improved patient outcomes. As indicated by NHTSA, EMS will mirror and, in many cases, lead this transition.

1.3.6 Injury Control and Research Centres

The United States took a leadership role and identified injury as a priority public health problem. In 1985, *Injury in America* and *Cost of Injury: A Report to Congress*, and a subsequent series of reviews of progress culminating in a *National Plan for Action* were published (Centers for Disease Control and Prevention, 1993). Consequently, as a result of such publications, two public health milestones were achieved in 1992 in the field of injury control. First, the National Center for Injury Prevention and Control was created at the CDC. This action solidified the leadership role delegated to the CDC in the mid-1980s, signaled a new governmental commitment to the issue, and raised hopes that the necessary funding will soon follow (Runyan, 1993). Also, this new division was organized to capitalize on CDC's strengths: interdisciplinary research, surveillance, rapid translation of research findings into prevention strategies, rapid implementation of interventions, and a long history of collaboration with state and local health agencies. A guiding rationale in early staffing and organizational decisions was that epidemiology, surveillance, data analysis, and data documentation formed a foundation for building a national injury control program (Foege et al, 1988). Second, Injury Control and Emergency Health Services (ICEHS), a new section of the American Public Health Association (APHA), was created in the hopes of reflecting the vitality and growth of the injury sector of public health.

"Infrastructure" (Ozanne-Smith and Williams, 1995) is required for the collection, analysis and dissemination of data in a small number of well coordinated, centralized government

departments or agencies. Infrastructure is also required for: research and development functions, for acting as a clearing-house for injury and injury control related information, for the provision of training in injury research and prevention and, importantly, for the leadership, driving and coordination of injury prevention activities. Health and Welfare Canada, in a *Health Services and Promotion Branch Working Paper*, clearly state that " the management of injury research within the federal government needs to be coordinated, perhaps by the formation of a unit [or a center] that would effectively administer a large-scale program[s] in injury control" (Stanwick, 1987). To this date, no federal unit or center exists.

One approach to having well developed infrastructure according to Berancik (1987) was the establishment of "community laboratories" or "population laboratories" by defining geographic regions with defined databases for long-term surveillance and in-depth assessment of morbidity and mortality, interventions, and their costs. The impetus for this initiative was the need for rapidly translating injury prevention research and policy into strong programs; the community served as the ideal laboratory for evaluating experimental intervention strategies systematically. Berancik (1987) maintained in his study that the establishment of such "laboratories" merited serious consideration. The US Department of Health and Human Services further supports Berancik (1987). The Department acknowledges that without "lead agencies" to provide coordinated focuses of activity, efforts by individuals, professionals, and government agencies remain scattered (US Department of Health and Human Services, 1991). Moreover, available resources are not maximized, efforts are unnecessarily duplicated or lack continuity, and time, energy, and funds are expended on isolated programs and research efforts that do not reduce injury morbidity and mortality. Effective lead agencies provide the leadership and vision to mobilize and guide communities. To this end, the Department emphasizes that reducing injuries requires a "coordinated effort among specialists in epidemiology, prevention, biomechanics,

treatment, and rehabilitation; the number of specialists now *trained* in these areas is inadequate" (US Department of Health and Human Services, 1991).

Similarly, from the Canadian perspective, Stanwick (1987), identifies that a "paradox" exists in that substantial knowledge exists pertaining to the prevention of injuries but the inability to ***apply*** or utilize this knowledge warrants exploration. Unlike in any Canadian communities, well-developed infrastructure (i.e., centers) for injury control and research already exists in some communities throughout the United States.

In the United States, well-developed and well-funded centers for injury control, injury prevention, injury research, and injury policy exist. In terms of the establishment of the NCIPC at the CDC and spin-offs thereof (NCIPC[2], 1989), it seems with increase in the knowledge and attention to the problem of injuries, more infrastructure has been developed and been able to keep pace with the advancements in the field. An Internet search of injury related web sites would easily reveal the various centers. Centers of such kind exist in Baltimore, Maryland (The Johns Hopkins Center for Injury Research and Policy), Pittsburgh, Pennsylvania (Center for Injury Research and Control), Seattle, Washington (Harborview Injury Prevention and Research Center), Atlanta, Georgia (Emory Center for Injury Control), Los Angeles, California (Southern California Injury Prevention Research Center), and Boston, Massachuschetts (Harvard Injury Control Center) to name a few. Some of these community-based injury control and research or prevention centers are housed on their own, in hospitals, trauma centers, or academically linked to universities and colleges. Such centers are involved in building the field of injury control by developing and enhancing scientific knowledge about the causes and prevention of injury problems, and creating a cadre of professionals trained to conduct injury research and implement preventive strategies. Thus, a common thread links all these centers, as well as others. The common thread is in each centers' mission and focus. Specifically, each center's mission,

regardless of wording, is to reduce the number and severity of injuries occurring in their respective communities. As for their focus, even though centers are unique in regards to their goals, objectives and priorities for action because of their unique contexts (i.e., community demographics and injury statistics), the focus of such centers surrounds the areas of injury research, surveillance and community collaboration. These centers have been successful in raising awareness of the injury problem, initiating community partnerships, mobilizing resources, implementing and measuring the effectiveness of prevention programs, and influencing policy makers.

In regards to the exact setting, there are no documented studies of community fire station-based injury control and research centers. This may be attributed to several factors:

- No existing or available model to establish such injury control infrastructures (i.e., no description of establishment process or logistics),
- The injury control system link to EMS has not been fully studied,
- Lack of resources (i.e., no knowledgeable or trained individuals to carry out such a task, little or no funding, no community support or "buy-in" into the concept),
- Injury control in Canada is relatively new (as compared to the United States), and a fire station-based injury control and research center is a very innovative idea that requires acceptance. However, such an acceptance can follow once people (e.g., local policymakers, community residents etc.) accept or, at the very least, acknowledge that injuries are indeed a problem and that they can be predicted and prevented.

Ultimately, these factors contribute to being the justification or motivation behind establishing a community fire station-based injury control and research center.

1.3.7 Summary of Literature

The above literature is succinctly presented in a "box-in-box" approach whereby each section describes a pertinent aspect of the present study. Each section not only describes an important study aspect, but also naturally fits into the others. This "fit" is specifically defined through the macro- to micro-level analysis of literature pertaining to the study. Epidemiology and public health provide the background knowledge necessary for an individual to gain expertise in injury surveillance data collection, analysis, dissemination, and especially, utilization through injury intervention analysis, design, development, implementation, and evaluation. Furthermore, dedicated infrastructure with the expert/knowledgeable and trained staff can describe the order in which all components of an intervention plan should receive attention, and also ascribe a strategic scheme and appropriate time-scale to the plan.

Injury control centers and fire stations fall into the realm of community level centers because such infrastructures provide a suitable environment in which to establish a community-based intervention. According to Berancik (1987), the RICRC in the County of Strathcona is a "community laboratory." Having an injury control center housed in a fire station and working closely with EMS personnel helps contribute information and resources (i.e., computerized surveillance systems such as RAMPART-EMS™(Strome, 1998)) to aid EMS personnel in injury prevention efforts. This information becomes important in that it can be later translated into appropriate educational or prevention "teaching moments" by both EMS and injury control personnel at the community level. As the particular injury surveillance data obtained from injury control and research centers would reflect the inherent safety needs of that particular community that are to be addressed, establishing such a center in a fire station would, therefore, seem logical as this setting would provide an appropriate avenue for EMS to, for instance, collaborate with community groups in an effort to expand their primary injury prevention (PIP) roles. These

centers, and programs therein, can be effectively developed through utilization of the Systems Approach which provides a framework for the overall establishment. Moreover, the necessary research required to elucidate what is involved in each of the Systems Approach phases for infrastructure establishment purposes can be described adequately by qualitative methods such as observations, interviews and document review. In addition, qualitative research is a methodology inherent in epidemiology/public health from which one can apply necessary measures to control disease and promote health in the community.

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CHAPTER TWO

Analysis and Design of a Sustainable Community Fire Station-Based Injury Control and Research Center

2.1 Introduction

By any measure, injuries represent a major health problem. Injuries affect the family, community, employers, health care systems and society as a whole. Injury control has been increasingly recognized as a legitimate public health concern. Implementation of injury control measures must be initiated at the local community level. Ideally, since most opportunities to reduce morbidity and mortality are out in the community rather than within health care settings, representatives of the community should share responsibility for program planning to ensure broad community support of the proposed program and increase its chances of success. The Haddon Matrix provides a framework to categorize the phases of injury and develop basic countermeasure, but a framework to address and develop injury control and research infrastructure is also necessary at the local level (Gallagher et al, 1993).

Public agencies and private safety organizations differ markedly in their objectives, range of activities, scope and manner of influence, and means of support. Such variables directly influence every phase of injury control, including data collection and interpretation, the selection of intervention strategies, and overall program evaluation. The aforementioned variables (organization-related differences) are further compounded by frequent disagreements between

researchers and practitioners about priorities and intervention strategies (US Department Health and Human Services, 1991). Ultimately, what results is that "most injury prevention efforts are scattered and uncoordinated, resulting in little impact on the overall incidence and outcome of injuries" (Micik and Miclette, 1985).

In an effort to address some of the aforementioned injury control issues and infrastructure concerns, the University of Alberta, Department of Public Health Sciences and the Strathcona County Emergency Services (SCES) instituted the establishment of a community-based center to address injury control and research at the local level in the County of Strathcona, Alberta. This community-based center, the Regional Injury Control and Research Centre (RICRC), is intended to be the first satellite center of the Alberta Centre for Injury Control and Research (ACICR). In addition, it is the first center in North America that is situated in a fire station. The primary motivations behind establishing this community injury control center in a fire station was due to the need to create a model for such centers and to examine the center's logical injury control link with EMS. In other words, because of the presence of various resources in the form of highly trained, motivated and dedicated EMS personnel, leadership, and prevention educators, the fire station setting provides the most appropriate "entry point" to initiate injury control.

2.2 Purpose

The purpose of this study is to identify and describe the important issues surrounding the need for the RICRC and its intended goals during the *Analysis* phase of the Systems Approach. In addition, this study also serves to identify and describe the location of the Centre, its unique setting, and the inherent functions of what the Centre is designed to perform

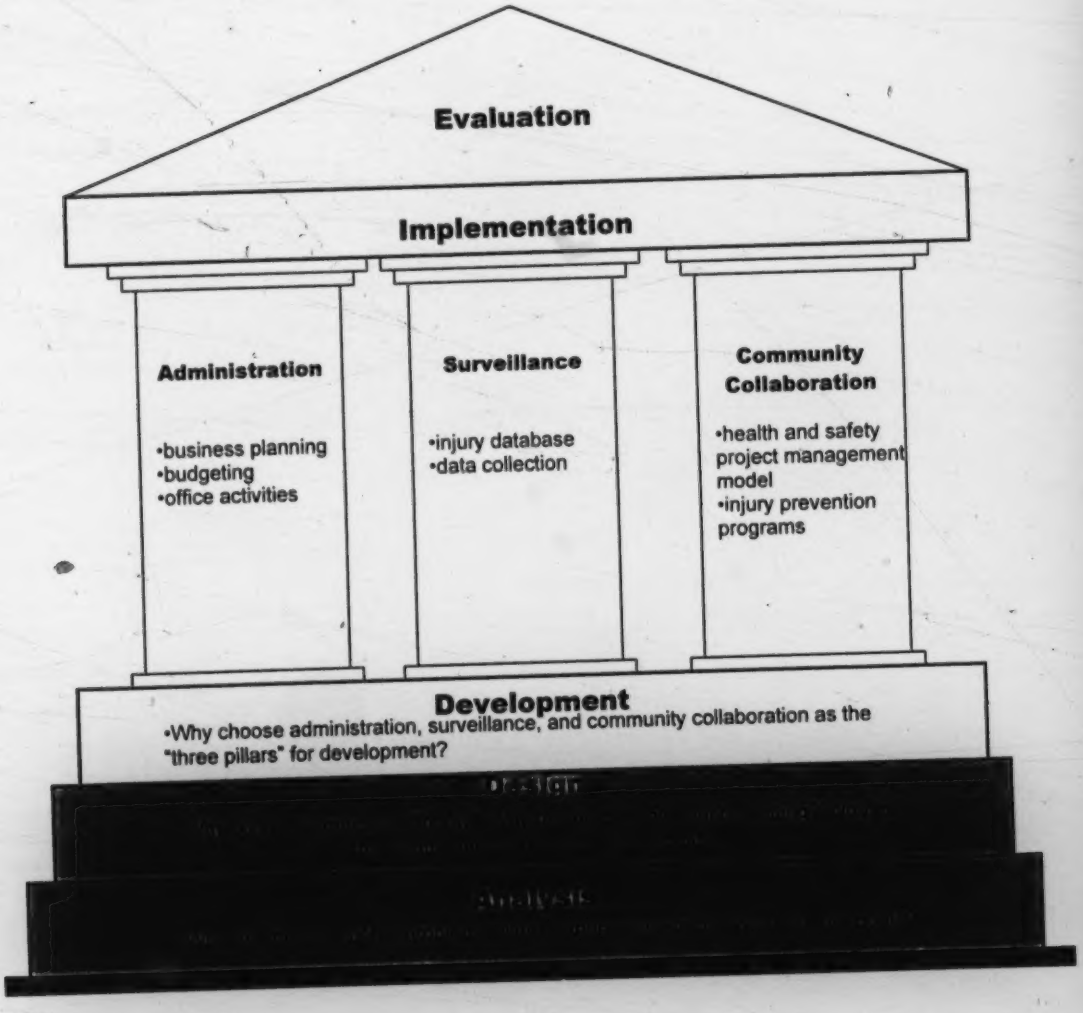
2.3 Methods

Due to the descriptive nature of the study in terms of describing the need, location, setting and functions for the RICRC, a qualitative research methodology was employed. The following Methods subsections describe the Systems Approach that was taken to perform the study, the selection of study participants, the data collection techniques, and the data analysis.

2.3.1 Systems Approach

The Systems Approach (Micik and Miclette, 1985; Gallagher, 1993), which consists of five distinct phases, is a "broad-based" and versatile method of addressing injury control in a "systematic" manner. It has traditionally been used in the creation of injury prevention programs and other interventions for injury control (Micik and Miclette, 1985). This approach is utilized so that the efforts of an individual(s) involved in a project are directed toward achieving the overall goals of the project or program. Figure 2.1 illustrates the conceptual framework in which these phases are utilized to establish the RICRC (shaded regions pertain to the present study). The *Analysis* phase defines the general problem and the problem at-hand, the need to solve the problem is also established, and an overall goal for the solution to the problem is determined. In the *Design* phase the target population where the intervention is to be located and set up is described, and strategies to achieve proposed goals for the intervention are considered and selected. In order to describe these two phases, qualitative research methods, highlighted below, to select study participants, collect data, and analyze the data are used.

Figure 2.1- Centre Establishment Conceptual Framework



2.3.2 Study Participants

For inclusion in the study, key informants (i.e., interview respondents) had to meet at least one of the following criteria:

- Persons who are injury control stakeholders in the County of Strathcona;
- Persons involved with the RICRC establishment during the researcher's tenure as Centre Coordinator- May 01, 1998 to April 30, 1999; and
- Persons closely involved in the RICRC's design before May 01, 1998.

Key informants selected represented three categories: injury control researchers, injury prevention programmers, and Strathcona County department officials. Subjects selected from these categories were chosen because they would represent a scientific, community, and administrative point of views, respectively. "Injury control researchers" included those with some training in injury control or related issues and thus, included public health students, professors, and physicians. "Injury prevention programmers" included those from within the County of Strathcona who were involved in community health and safety organizations or groups. Lastly, "Strathcona County department officials" included County residents employed in either the EMS or legislative fields.

2.3.3 Data Collection

Data collection was performed by the researcher who was acting in the "observer as participant" role (Rothe, 1993). The researcher was in the participant role of Centre Coordinator and was answering phone calls, performed data entry and analysis, wrote reports and other administrative duties; and the researcher always took time to discuss study issues of interest and took notes accordingly.

Data pertaining to the specific Systems Approach phases of *Analysis* and *Design* were collected through interviewing and document review.

INTERVIEWS

Interviews were performed by the researcher because they provide an opportunity for respondents to speak their minds about issues they cannot adequately express through other qualitative methods such as on questionnaires, they allow for expansion of ideas and clarifications, and they allow for on-site verification of answers, whether that be with the same interviewee or other respondents to be interviewed in the future (Rothe, 1993).

The interview technique used with participants was the semi-structured interview. These interviews were built in advance around a core of structured questions from which the interviewer could branch off to explore in-depth through probing questions. Because this study examined the need (*Analysis* phase) and setting (*Design* phase) of the Centre, the core of structured questions were based on questions developed by the CDC to describe infrastructure building. The questions were designed so that they should be easy to answer, yield needed and useful information, be interesting to the researcher and interviewees, and be chosen from the researcher's readings and experiences, and from previous discussions with colleagues. The following questions pertaining to *Analysis* and *Design* phases formed the nucleus of the interviews:

ANALYSIS PHASE:

- What was your reason for being part of the establishment process for the Centre?
- Was there in fact a need for the Centre? Why or why not?
- What was the ultimate goal you saw of this injury control center?

DESIGN PHASE:

- Why do you think Strathcona County was chosen as the pilot site?
- Why do you think a fire station was chosen to house the Centre?
- What did you see the Centre doing after one year of operation?
- How do you think the role of EMS will change with the Centre's presence?

Open-ended items allow flexibility, depth, clarification, and probing of responses. They would also allow for unexpected responses that may reveal significant information not anticipated by the research design.

Interview Process (Rothe, 1991)

A. Preparation for Entry

After subjects were identified by inclusion and exclusion criteria, the researcher contacted subjects by phone and/or in person to request their participation in the interviews. Subjects were contacted early during the study period (May 01, 1998 – April 30, 1999) and most interviews occurred in the latter stages of the study (e.g. January 01, 1999 – April 30, 1999).

B. Negotiation for Entry

Potential interviewees were provided an information and consent sheet outlining researchers' names and involvement, an introduction about the topic(s) covered, probable length of time required, and promises of anonymity and confidentiality of information obtained (Appendix IV). Moreover, consistent with proper negotiating procedures (Rothe, 1993), after gaining consent from the subject, the researcher stressed that confidentiality would be enforced by cleansing of data, the interview required approximately 45-90 minutes, the interview required one session, the place of the meeting was at the discretion of the interviewee, there would be no repercussions or assessment of blame. If the subject did not give consent to an interview, the interviewee asked for a reason that was then recorded. Of the 17 subjects that were

selected as interview participants, 14 (82%) gave consent. 3 subjects (18%) did not choose to participate in the interview due to personal reasons.

C. *Entry*

A key aspect of any interview is the establishment of confluence or cooperation between the interviewer and interviewee (Rothe, 1993). Much of this cooperation was established due to early rapport building between interviewer and subjects. Participants were made to feel comfortable that the interviewer has "shared knowledge" about injuries, injury control and Center establishment, and that the interview is structured on a trustworthy basis. Interviews were performed at either the RICRC, or participants' place of employment. Participants were phoned in advance of the interview to confirm subject participation. The interviewer answered any questions by the participants to reduce apprehension. The participant was then "warmed-up" with general conversation, background noise was eliminated or reduced, and the tape recorder was placed as close to the subject as possible. Each tape was started by the interviewer in the presence of the participant with the interview number (i.e., confidentiality statement). Throughout the interview, the researcher depended upon elicitation procedures. The right (i.e. most appropriate) question was negotiated at the right time. Leading questions were followed, when deemed proper, by secondary or follow-up clarification questions. Slight topic switching and answer extensions helped acquire maximum data because the participants were able to expand on topics important to them.

D. *Exit*

At the end of the interview, the participant was asked if he/she would like to add anything which was not covered in the interview.

E. *Transcription*

Because of the pace of an interview, the act of writing would either slow the interview unnecessarily or cause the interviewer to be selective in the kind and amount of information that is recorded, at the risk of introducing bias. Consequently, tape recording, being the most

accurate means of preserving interviews (Horne, 1995), was the method of choice for recording. It was explained to all respondents the need for taping interviews – i.e., taping gives an accurate record of what they have said rather than having their responses filtered through the interviewer's interpretation. Taped interviews were then transcribed (taking approximately three weeks) into typed form by the researcher. With respect to organizing transcriptions, transcriptions were dated and then placed in order.

F. Data Analysis

Data analysis was performed after all interview data was collected and transcribed. After each interview was transcribed, short notes were made on the transcriptions highlighting significant themes. Specifically, surface descriptions were used to reflect the information the interviewees present according to simple categories or themes (Rothe, 1993). In elucidating surface descriptions pertaining to *Analysis* and *Design* phases of the Systems Approach, the researcher searched for descriptors interviewees used to show points of view which may be favorable, unfavorable, strong, weak, serious, humorous, critical etc., as well as identifying use of syntactical devices such as searching for interviewer agreement.

Interview Data Validity

Interview data were validated in the field (i.e., during data gathering) through the following procedures:

- Probing included strategic inclusion of secondary questions that help clarify original answers and elicit further concerns or descriptions about injury and the Centre. During interviews the interviewer probed respondents with a variety of follow-up questions that clarify the meaning of the original response. Some probing examples are:
  - Are you saying that…
  - Do you mean that…
  - What might be another way of saying that…

- Interview participants were provided with copies of the transcriptions and any associated data analyses and interpretations for participant validation (Rothe, 1993). Participants' comments about the researcher's writings provided a degree of assuredness as to the validity of interpretations.
- According to Rothe (1993), based on the assumption that the world is a "shared one" in which people intersubjectively understand individual and group meanings, the researcher focused on a response given by an interview participant and asked others about it (e.g. Centre as a "catalyst" for change). By using this process the researcher was more apt to discover the generalized meaning or idiosyncrasy of an answer.

In addition, interview data is often dependent on respondent credibility (Rothe, 1993). Respondent credibility was assured in that the interviewer was able to evaluate the authenticity of a particular respondent by asking himself the following questions (Becker, 1977):

- Does the interviewer have any reason to lie or conceal information?
- Does vanity, expediency or self-image lead an interviewee to mis-state his or her role in the event, or attitude toward a particular issue?
- Do his or her feelings about issues, persons, events, ideologies and the interviewer lead him or her to alter a story or re-interpret the information?

DOCUMENT REVIEW

Documents used for review to support and substantiate the Systems Approach phases of *Analysis* and *Design* are briefly outlined in Table 2.1. Similar to the interviews, these documents were analyzed using surface descriptions. Specifically, similarity of ideas and concepts were identified among documents through specific word usage or descriptors (i.e. words such as "communication," "surveillance," etc.) Such descriptors aided in highlighting significant categories and themes. These themes and categories were further correlated with those for interview data.

Table 2.1- Document Review Overview

DOCUMENT NAME	YEAR PERFORMED/ PUBLISHED BY	COLLECTION PROCESS	SUMMARY	MAJOR BENEFITS/ SYSTEMS APPROACH PHASE USE
Injury Prevention and the Health System	Provincial Health Council of Alberta – 1997/1998	Direct telephone request made to Health Council of Alberta	- Council monitors health system functionality as a whole - Council established task force to examine the injury problem in Alberta, the role the health system is playing in injury prevention, the impact of health reform on injury prevention and what is needed for making further progress in reducing injuries - Task force established that injuries are indeed a problem worth addressing and requiring considerable support - Data was collected through statistics review, reports, discussions with practitioners and specialists in injury prevention, case illustrations were gathered to help understand the range and persona impact of injuries, and a consultation process and focus groups were initiated to discuss further progress required - Council reported: "The challenge of injuries remains significant and epidemic in proportion…."	- provincial in nature thereby taking into account local needs - brings a comprehensive "citizen's view" of the health system thereby describing general attitudes toward injuries and the need to reduce them - recent study containing current information on the nature of health care and health care delivery in Alberta - need defined in regards to magnitude of the injury problem (i.e. statistics) - useful for *Analysis* Phase
Health Summit '99- Think About Health- Final Report and Recommendations	Alberta Health Communications, 1999	Direct telephone request made to Alberta Health Communications	- Summit sought input from a wide variety of participants on essential components of Alberta's health system, the required changes to be made in the delivery and management of health services, individual responsibility for health, the amount of money required to sustain a publicly funded health system - Health system components that participants	- participation of individuals with diverse backgrounds and medical specializations - indicated need in regards to injury control components - recent study - useful for *Analysis* Phase

			found essential were directly related to the injury control components (e.g. acute care, prevention, information and evidence, teamwork etc.)	
RICRC Business Plan May 01, 1998 – April 30, 1999	Regional Injury Control and Research Centre, 1998	RICRC document- no contact required	- Strategic planning document prepared by Centre Coordinator that outlines, goals, objectives, timeline, budget, principles of operations, members etc. for the establishment and operation of the RICRC	- recent document - useful for assessing needs and describing how needs will be met- *Analysis* Phase
How Healthy are we?-Health Status in the Capital Health Region: A Technical Report 1997	Capital Health Authority, 1997	Direct telephone request made to Strathcona County Health Unit	- provides information on the general health of people in the Capital Health Region of Alberta and key factors that affect our health - highlighted injuries as an important issue impacting health - provides population demographics	- recent report with as current as possible health status information - statistics show the magnitude of injuries at the local/regional level- important for *Analysis* phase
Injury Statistics for Alberta, CHA, and County of Strathcona	Injury Prevention Centre (ACICR as of Sept.1998)	Direct request made to IPC/ACICR (1996/1998)	- contains various age-related, cause of injury data - injury hospitalizations and emergency room (ER) statistics	- combines data from a variety of sources such as Alberta Municipal Affairs, Vital Statistics, and National Trauma Registry Report - useful in *Analysis* phase for identifying injury problem
Design and Development of a Computerized Emergency Medical Services-Based Surveillance System	University of Alberta, Department of Public Health Sciences Author: T. Strome (1998)	Department document- no contact required	- design, development and testing of a computerized EMS-based surveillance system that can be used for injury data collection and analysis	- provides recent injury data for County of Strathcona- important in *Analysis* phase - reflects general provincial trends

2.3.4 Data Analysis

After interview and document review data were analyzed separately using surface descriptions, similar categories and themes were identified and described for both phases.

The *Analysis* phase, as per the aforementioned Systems Approach requirements, is divided into three distinct categories: Problem Definition, Needs Assessment, and Goal Determination. Problem Definition elucidates the problem of injuries through a description of injury morbidity and mortality statistics in the County of Strathcona. Needs Assessment addresses the particular injury control needs of the County of Strathcona. This category consists of four distinct themes: need for progress, need for surveillance, need for community collaboration, and need for resources. The macro level analysis of provincial documents and the micro level analysis of interview respondents substantiate these needs. Lastly, Goal Determination briefly outlines the goals in regards to the vision and mission of the injury control and research center.

The *Design* phase, as per the Systems Approach requirements, is intended to describe the target population of the County of Strathcona, as well as the fire station setting, and provide a "blueprint" of what the Centre is intended to do and look like. To that end, interview and document review data were synthesized into three categories: County of Strathcona, Fire Station Setting, and Centre Blueprint. Furthermore, sub-categories were identified in these three main categories from which themes were highlighted.

The aforementioned similarity of categories and themes among interview responses themselves, document reviews themselves, and among interviews and document reviews addressed the issue of data reliability. Specifically, this similarity of responses within the study time period is referred to as synchronic reliability (Kirk and Miller, 1986; Rothe, 1993).

2.4 Results

2.4.1 Systems Approach - Analysis Phase

I. Problem Definition

There is convincing evidence to substantiate the claim that injuries are a problem in the County of Strathcona. However, the integral aspect of the injury problem and this study, is in fact, the *magnitude* of the problem as it relates to the County of Strathcona. The following statistical data relating to injury morbidity and mortality gathered from provincial documents and reports, as well as from a previous injury study conducted in the County, indicates that injuries are a problem in the County of Strathcona. Appendix III illustrates that the County statistics follow similar regional (Capital Health Authority) and provincial injury trends. This multi-level trends comparison further substantiates injury as a community-wide problem.

Compared to the province and Capital Health Region, the County of Strathcona shows similar trends. For example, the 1996 hospitalization rate for males aged 1-14 (200/100,000) is higher than for females in the same age group. In fact, this rate is one of the highest rates in the Capital Health Region (Capital Health, 1997). It is even higher than the Regional average (150/100,000). On the other hand, for females aged 1-14, the County has one of the highest percentages for ER visits (32.1%) when compared to other regions within the Capital Health Region as well as when compared to the Regional average (30.2%). Furthermore, 1997 and 1998 data from the ACICR (1998) substantiate some other trends in regards to ER visits (in Capital Health Region ER departments) by cause of injury. These trends include:

- Males out numbered females in regards to total ER visits. Males accounted for 62% (n=2111) of the total number of injury-related ER visits (N=3424). Females accounted for 38% (n=1313) of the visits.

- Falls (n=362, 28%) and motor vehicle related (n=148, 11%) injuries accounted for the highest total number of ER visits by females across all injury types and most age groups.
- Falls (n=386, 18%), struck by object/person (n=260, 12%), cutting/piercing (n=213, 10%), and motor vehicle-related (n=206, 10%) injuries accounted for the highest total number of ER visits by males across all injury types and most age ranges (especially, 15-24 age group).
- The overall leading causes of injury-related ER visits for both sexes were falls (n=748, 22%), struck by object/person (n=366, 11%), and motor vehicle related (n=354, 10%).
- The 15-24 age group for both sexes had the greatest number of injuries (n=884, 26%).
- There were considerably more injury-related ER visits to males and females under the age of 44 (n=2710, 79%) than there were to those above this age (n=714, 21%).

Such trends in the County of Strathcona have not only been observed since 1996, but rather, they have also been seen in the early part of the decade. The following table, Table 2.2, is a summary of injury trends from 1992 to 1994 inclusive (Injury Prevention Centre, 1996).

Table 2.2 – Injury Trends in the County of Strathcona (1992-1994)

Injury Category	Statistics	Trends
Injury Hospitalization by Gender	• 1992: N=609; males = 64%, females = 36% • 1993: N=593; males = 60%, females = 40% • 1994: N=389; males = 59%, females = 41%	• From 1992-94, the proportion of males to females hospitalized was approximately 2:1.
Injury Hospitalization by Age Group	• 1992: n=103, 17%; • 1993: n=117, 20%; • 1994: n=84, 22%	• 15-24 year age group contained the most injury hospitalizations from 1992 to 1994. • Overall, those under 44 years of age had more injury hospitalizations than those above 44 years.
Leading Causes of Injury Hospitalizations	• Falls- 1992: n=224, 37% 1993: n=224, 38% 1994: n=118, 30% • Motor Vehicle Collisions- 1992: n=83, 14% 1993: n=64, 11% 1994: n=70, 18%	• From 1992 to 1994, falls and motor vehicle collisions ranked first and second, respectively, as leading causes of injury hospitalizations.
Injury Deaths by Gender	• 1992: n=14; males = 79%, females = 21% • 1993: n=15; males = 73%, females = 27% • 1994: n=15; males = 73%, females = 27%	• More males than females died as a result of injuries between 1992 and 1994.
Injury Deaths by Age Group	• 1992: 25-34 year age group contained the highest number of injury deaths (n=7, 50%) • 1993: 15-24, 25-34, and 55-64 year age groups contained the highest number of injury deaths (n=3, 20% among each age group) • 1994: 15-24 year age group contained the highest number of injury deaths (n=5, 33%)	• Overall, the general trend was that most injury deaths occurred to County residents under the age of 44.
Injury Deaths by Cause	• Suicide- 1992: n=7, 50% 1993: n=7, 47% 1994: n=7, 47% • Motor Vehicle-Related- 1992: n=2, 14% 1993: n=3, 20% 1994: n=5, 33%	• Suicide and motor vehicle-related deaths ranked as the top causes of death from 1992 to 1994.

Interestingly, the above 1992 to 1994 injury trends are similarly reflected in the EMS-based study conducted by Strome (1998) in the same community. For example, there were more males injured than females (N=338; males- n=199, 59% and females- n=139, 41%) (Strome, 1998). The greatest number of injuries occurred to persons between the ages of 15-24 (n=77, 22%) and approximately 66% of the injuries in that study population occurred to those under the age of 44 (n=218, 64%) (Strome, 1998). In addition, greater than 75% of all injuries in the County of Strathcona were caused by motor vehicle collisions or falls. There were a total of six injury deaths in 1998 in the County. Of these six deaths, four (67%) were motor vehicle-related and two (33%)were suicide deaths. Ultimately, Strome's (1998) study concluded that injury statistics for the County of Strathcona "generally reflected the trends for the province of Alberta."

II. Needs Assessment

Having established that injuries are a problem in regards to their relatively high rates of morbidity and mortality and frequently observed trends (when compared to provincial or regional statistics), the need to control the frequency and severity of injuries at the community level through the establishment of an injury control and research center becomes evident. However, such a general need could be elaborated through the analysis of four distinct needs: need for progress, surveillance, community collaboration and resources. The following is a detailed description of these specific injury control related needs as identified and substantiated through document review and interview data.

NEED FOR PROGRESS

The Provincial Health Council of Alberta report (1998) indicated that "although injury prevention was on the health system agenda, progress appeared to be minimal." The report stated that, "there seems to be quite a bit of talk and less activity around the issue of preventing injuries." Continuing or even increasing the same type of activity, commonly referred to as "re-

inventing the wheel," would not raise the health system to a higher level of effectiveness. Rather, the Council suggested that more emphasis on *"working together"*, *"advocating"* healthy public policy and addressing the overall determinants of health was needed. Overall, there needed to be more opportunity for formalized interregional networking among program staff to share knowledge, experience and support.

Ultimately, to make significant and sustainable progress, the Council stated that the province must create an environment where Albertans refuse to accept injuries as "accidents" over which they have no control, to an environment where injuries are seen as predictable, preventable and unacceptable. Such a culture change could be initiated at "ground zero" - the community level- by way of local awareness efforts. In regards to increasing awareness of injuries, one interview respondent referred to educating a variety of people on injuries in order to:

> *"...get injuries on the agenda of politicians, community leaders, and the EMS community...."*

The Health Summit '99 Report (Alberta Health Communications, 1999) indicated that for progress to occur in reducing injuries, attention needed to be given to the health system components, as well as injury control system components, of "Prevention and Promotion." The Report stated that Albertans wanted to see more emphasis on prevention and promotion initiatives and early intervention. They wanted to see a better balance between health promotion and wellness and diagnosis and treatment of illness and injury. Moreover, participants at Health Summit agreed that not only individuals, but families, the health system, communities, different levels of government, and other sectors of the health system have responsibilities in protecting and preserving their own health. According to the Report, having such a responsibility requires education in that Albertans need to be aware of and learn what services are available and how they should be used (Alberta Health Communications, 1999). They need to be kept informed about potential health risks and strategies for preserving health. Moreover, the information made

available to people will allow them to expand their knowledge about health lifestyles and the preventive steps that can be taken.

Both reports indicated that progress in reducing injuries is required in the larger spectrum of injury control. To better illustrate this interpretation further, interview respondents indicated progress in injury control was needed in terms of having a *"model infrastructure"* such as the RICRC and *"program validation."* First, a model center that could incorporate the injury control recommendations from the reports was a suitable solution. By having this model center, there could be an elimination of the *"trial and error"* or *"gut feel"* approach that resulted because people did not have the background knowledge or appropriate level of expertise to address injury control issues. In fact, the Centre would utilize a scientific approach and apply scientific rigor to its activities in an effort to aid other groups and agencies in the community. Such a model could be used by communities to addresses any injury control deficiencies and limitations by being a *"catalyst for change."* Being a catalyst would then provide an opportunity for injury control stakeholders, such as EMS personnel, to be more proactive rather than reactive in their roles. The following interviewee responses illustrate the perspective of the RICRC being a model and a "catalyst" that would be a map and hence, provide direction and structure to community injury control initiatives:

> *"...it[RICRC] was a **catalyst**... None of us have the knowledge or the background the Centre brought to us that said these are somethings we should work on...And that's not our expertise; we're reactive not proactive.... The crisis occurs, we react to it, we respond to it, we deal with it. We'd loved to be proactive, but that's not in our training. That's not been ingrained in us how to be proactive. The Centre can definitely helps us there."*
>
> *"The ultimate goal was to have it [the RICRC] be a **model** that other places could develop in terms of incorporating injury control within the fabric of existing organizations so that everybody does injury control so that eventually you don't need a provincial Centre because everyone at every level is doing it."*
>
> *"...you didn't have a **model** that you could actually base injury control on, so a lot of it was a **gut feel** or **trial and error**. The cons are obviously, if you don't have a model to base it on, it's very hard to know what the road map is."*

> *" We felt that changes were taking place in the province to look at a more complete* ***model*** *because one thing that it[the province] didn't do was approach anything from a particularly* ***scientific manner****, ...so we wanted to move away from that model to include both greater community involvement and put some* ***scientific rigor*** *into what was going on."*

In addition, the following responses explicated that in order for progress to occur through prevention programs, the need to validate the success of programs was required. Ultimately, this would ensure continued program resources and explore if positive changes (i.e., reduction in injury frequency and severity) over the long-term were occurring in the community as a result of the Centre's influence.

> *"...That's where you [RICRC] come in and say 'here's a program that we think we should implement and follow through.' And that's another key thing, not just to implement it and it disappears. Implement it, follow through, and find out if we* ***made a difference****? Having the Centre in the fire station, we can then say if within three months, are we making* ***progress****."*

> *"We don't have the ability right now to say what we are doing is making an* ***impact****; we can see short term improvements in our patients, but we never see the long term, that because we did a proper immobilization of this injury, this person, instead of spending six months in rehab is only spending three weeks."*

> *"I think we still have to* ***justify our being*** *and I think only by doing that,* ***statistics keeps us honest****. We can be* ***rewarded by continuing on next year*** *because we have done a good job this year, so our program is going to continue on next year."*

NEED FOR SURVEILLANCE

The Provincial Health Council found that data and information are *"insufficient"* and of *"variable quantity."* Highlighted in the report was the *"lack of evidence-based decision making."* Practitioners had acknowledged that decisions as to injury prevention initiatives were too often based more on a "flavor of the week" approach than evidence and need. Thus, there is an increased need or emphasis on basing effective control efforts on "sound epidemiology and properly evaluating injury prevention interventions to determine their effectiveness in reducing injuries" (Provincial Health Council of Alberta, 1998). Thus, the Council provided the evidence to substantiate the fact that Alberta communities want to be more strategic in targeting initiatives to make sure the resources they put toward injury prevention are being used effectively.

Similarly, the Health Summit '99 Report recommended that, in regards to surveillance (information and evidence), there be more emphasis on *"evidence-based decision making"* and the need *to "define targets," "set standards"* and *"measure performance"* (Alberta Health Communications, 1999). Injury surveillance would be able to determine the nature, frequency, and cause of injuries. They also called for *"monitoring"* and *"evaluation"* to assess the outcomes of interventions and new approaches, and improved accountability.

The importance of injury surveillance was re-iterated by many interviewees who indicated that appropriate surveillance would avoid the present day *"hit and miss"* approach to injury prevention by providing the necessary statistics and *"information exchange"* to substantiate injury prevention priorities and provide data from which to base *"training"* initiatives. Essentially, the Centre was needed to: act as a clearinghouse for information (i.e., injury statistics, prevention program efficacy, etc.) provided in a readily accessible, user friendly format; be a resource to substantiate the causes of injury so as to assist community injury control stakeholders in aligning their efforts with community needs; and act as a resource to provide, based on surveillance evidence, a focused approach to training individuals in injury control. The following responses are provided to further illustrate this interpretation:

> *"Anything that provides **quantitative backup** in terms of what **direction** to put efforts towards injury control makes sense in the lines of the mission...**there clearly was the need for information**. The Centre was the means to gather it. Then it makes some sense that there would be a need for the Centre."*
>
> *"...if there was an entity that could **capture the data and disseminate** it in a quick, user friendly format, then that would be very good. The Centre appears to be one way of doing that."*
>
> *"...if you're training your crews to respond to certain types of incidents, it's better often to know what incidents are prevalent in your area because, of course, you want to **concentrate** your **training efforts** on those. Training for incidents that are not going to happen, or are two percent of your total call volume, that's not appropriate."*
>
> *"**Hit and miss**... Strictly hit or miss, we would train on this and that and **nothing would be specific**..."*

> *"...the **support** by the Centre was that it would be able to provide data that could **substantiate** the cause of injuries and identify what some of the leading causes were so that we could **realign our efforts** with making a difference in those areas."*
>
> *"As far as injury control and tracking and ideas, we didn't really have any access to any information that I'm aware of, and as far as preventative issues, **it's very difficult to know where to start when you don't have a beginning**."*
>
> *"I see it as a gathering of a lot of information and probably much more comprehensive than the piecemeal that is being gathered right now."*
>
> *"...The first glaring fact was that we had no data. But the second fact was that once we had that data, unless we were able to **act on that data** there is absolutely no reason for collecting that data at all. Therefore, if we are going to have the better data, we better have something out in the community that will help us act on the data that we find to enable community resources to better reduce the rate and severity of injuries and help promote a general awareness of injury and injury prevention."*

NEED FOR COMMUNITY COLLABORATION

The Provincial Health Council of Alberta (1998) concluded that better collaboration, cooperation, teamwork, and networking among injury control stakeholders both inside and outside the health system at community, regional and provincial levels was needed. Formalized mechanisms for intersectoral cooperation and collaboration are needed so stakeholders may share program and management knowledge, experience and support. Even more important, more effective intersectoral cooperation is needed if a sustainable improvement in health status and a reduction of costs to the health system and Albertans due to injuries is expected. A subsequent paper by Sharma (1999) illustrates the community collaborative progress made at the RICRC.

"Teamwork" was highlighted in the Health Summit '99 Report (Alberta Health Communications, 1999). The Report indicated that Albertans called for more emphasis on multi-disciplinary teams with a more integrated approach to health care. They wanted to see a more collaborative system where people and health care agencies work together to provide integrated care focused on the patient's needs. This multi-disciplinary, collaborative approach puts more of

the focus on examining the causes of problems in health in our communities rather than simply treating the problems when they happened, as is the present case with injuries.

Interview participants also indicated the need to *"create contact"* among community members so as to bring about a focused approach to injury control and *unite* community groups with a vision and mission for injury control. In respondents' words:

> *"...we needed a Centre that identified to the community that we need to take a **collaborative role**, not only to council but to the community and anybody involved in the field of either health or emergency services, RCMP, all of the coordinated groups... that we had to have a Centre that identified that we could do something about injury prevention...*
>
> *"I thought there was a need for a Centre that brought everybody **under one roof** and made sure that we had a **united voice** and a thrust towards injury prevention..."*

NEED FOR RESOURCES

Human and financial resources are limited and short term. The existing approach to injury prevention is fragmented and uncoordinated as various staff members may integrate injury prevention into their regular responsibilities, doing what they can while dealing with heavy workloads and multiple priorities. However, this approach makes it more difficult to have a plan and accountability for injury prevention. Moreover, those who have specifically been assigned responsibilities in injury prevention are often expected to be all things to all people on all issues. Injury prevention stakeholders outside the health system informed the Council that the health system had few if any human or financial resources to offer on collaborative projects. However, through its consultations with key informants, the Provincial Health Council of Alberta (1998) discovered that public demand and health system support for injury prevention, never mind the bigger picture of injury control, fall far behind the demand and support for treatment. The resources that go into the health system specifically dedicated to reducing the number of injuries pale in comparison to the resources that go into treating them. Moreover, the Council indicated that continuation or increase in the same type of existing unstructured, unisectoral, fragmented

and/or short term financed approach for injury prevention initiatives that has been used in the past will not provide the necessary impetus to raise the health system as a whole to the necessary level of effectiveness. In addition, there is a shortage of *qualified* human resources to draw upon in this field. It has often been the case where physicians, emergency, home care and public health nurses, health promotion and other staff develop and implement injury prevention initiatives among many other areas of responsibility. According to the results of the Council, there seems to be a perception that no specific training is needed to play a leadership role in injury control- it is something "you learn as you go" (Provincial Health Council of Alberta, 1998).

The Health Summit '99 Report also maintained that there needed to be the *"right people doing the right work."* To that end, they recommended that there be trained professionals in injury control to handle the particular demands of this field that cannot be accomplished by the layperson (Alberta Health Communications, 1999).

Respondents also explicated the need to have the appropriate infrastructure that contained within it the specific knowledge to provide the necessary training in injury control. The need for having this infrastructure was also described through the infrastructure being able to act as the organization capable of providing the necessary resources so as to maintain community safety programs for the long-term; instead of the sporadic nature to which they are presently accustomed. For example, as one respondent indicated:

> *"...we aren't the ones pushing the program. We're there to support it, work with it and be the frontline people.* ***We don't have the ability, the training, knowledge or that infrastructure.*** *So it's* ***flash in the pan*** *and another program comes in and we work with it and then it's gone. There's* ***no lasting organization*** *to maintain these programs."*

Furthermore, with the level of expertise provided through the Centre, there could be increased data collection, analysis, evaluation and, ultimately, coordination of injury control initiatives in the community. Having such expertise in injury control at the Centre could also contribute to a

reduction in the duplication of activity and hence, further maximize their coordination. To that end, some respondents said:

> *"I think on a day to day basis, I could certainly tell you where and how accidents occur – just from experience - but I can't provide that information to you in any statistical formats like the Centre can, or even identify major areas."*
>
> *"Need for a unified body to lobby governments for change and not just make posters etc. RICRC can do this. It can also* ***minimize duplication of activity and maximize coordination of it.****"*
>
> *"I think there was the need for the* ***coordination*** *of their activities as they didn't have a lot of it. The police were doing the bicycle helmet program, emergency services was, recreation parks were... Everybody was trying something in injury control and it wasn't getting anywhere and there was a* ***lot of duplication of effort*** *in research, program delivery, in a lot of different ways."*
>
> *"Also it [RICRC] would become a single point of entry for people to bring the information and get the answers. It[RICRC] also has more human resource dedicated to it. No one was dedicated to it. It was always just another job that was on the periphery of everyone's responsibility. It was never anyone's primary responsibility and that was a key thing...."*
>
> *"Certainly, by having percentages and figures and graphs and charts and everything available to back our efforts up is important and that's where the Injury Control Centre can help us."*

III. Goal Determination

Based on the results of the needs assessment, the following goals, presented in Table 2.3, for the RICRC were set:

Table 2.3 – 3-year RICRC Goals and Objectives

	GOAL	OBJECTIVES
Year One	Striving to become Alberta's Safest Community	• increased awareness of the burden of injuries and the presence of an injury control and research center in the community • increased local injury surveillance and statistics • identification of potential opportunities and solution • surrounding communities beginning to share the vision of community-based injury control and begin to participate • effectively disseminate of information to the media to help in making injury a more recognized area of public health
Year Two	On the Horizon to Becoming Alberta's Safest Community	• Identify and integrate new data sources into injury research • Influence local policy makers on intervention priorities • Apply community solutions to community problems • A sense of safety is created in the community • Ensure that the injury problem becomes more visible on the public agenda and with in multiple health spheres
Year Three	County of Strathcona Becomes Alberta's Safest Community	• A 20% decrease in injuries

Source: RICRC Business Plan, 1998

2.4.2 Systems Approach - Design Phase

The *Design* phase is intended to provide background information from interview respondents pertaining to the selection of locating the RICRC in the target population of the County of Strathcona and its unique fire station setting. In addition, this phase also serves as an extension of the *Analysis* phase by describing the strategies as to what the Centre is intended to do and how it will go about meeting those intentions. To that end, three specific categories define the *Design* phase: County of Strathcona, Fire Station Setting, and Centre Blueprint.

I. County of Strathcona

Knowledge of the community in which the injury control and research center is established is essential in providing an overall picture or profile of the community. Figure 2.2 depicts the community profile of the County of Strathcona.

Figure 2.2- Community Profile of County of Strathcona

Population and Employment:

	Total	Sherwood Park	Suburban	Rural
1998	**65,349**	**42,457**	**18,308**	**4,584**
2001 (proj.)	71,156	47,236	19,403	4,517

Increase in population, 1990-98: 22%
Average Age: 33.27 years
Existing jobs: 20, 369 (58% of labor force)
Average annual growth rate: 2.75%
Total labor force: 35,290 (1998 census)
Employment rate: 97.5% (Alberta: 94.8%)

Economic and Financial Highlights:

- Operating expenditures: $78,786,000; Per capita spending: $923(1998 $874)
- Allocation of each dollar of residential property tax: education- 50.2¢; municipal services- 48.3¢; library- 1.5¢
- Businesses registered: 1,346
  - Manufacturing industries: 199
  - Home-based industries: 470
  - Retail/Commercial: 335
  - Other: 342

Protective Services:

- Police officers: 59; Bylaw officers: 7; Firefighters: 54 full-time and 110 part-time; Fire stations: 5; Emergency incidents, 1998: 2,714; incidents needing ambulance or rescue: 2,175 (78%); RCMP Victim Services Unit: 1,400 contacts

Transportation:

- Highways: 134 km primary, 113 km secondary; Municipal roads: 1,370 km rural; 220 km urban; Transit riders, 1998: 1,115,000; Accessible transportation riders: 12,000 clients

Environment, Agriculture, and Open Space:

- Sports fields and ball diamonds: 190
- Parkland: 794 hectares
- Playgrounds: 118, Tennis courts: 18, Golf Courses: 7, Outdoor rinks: 25

Community Services (1998):

- Counseling: 630 families; 3,200 hours

Geography:

- County-wide area: 1,268 km^2 (489 square miles)
- Industrial: 7, 177 hectares (17, 734 acres); Commercial: 107 hectares (264 acres)
- Residential: 1, 413 hectares (3, 419 acres); Agricultural: 94, 002 hectares (232, 276 acres)
- Park/recreation/natural: 8, 517 hectares (21, 045 acres)

Political Structure:

Local government structure consists of one mayor and six ward councilors.

Source:1999 Interim Budget and Strathcona County: Advantage Now, March 1999; Health Status in the Capital Health Region: A Technical Report, 1997

Interview responses substantiated some of the unique qualities of the County of Strathcona. Interviewees indicated that the County was a *"leader,"* especially in testing out new and innovative initiatives, that other communities could model themselves after. With the County itself being a leader and a model to other municipalities, this is intimately tied to the *Analysis* aspect of the Centre being an injury control infrastructure model for other communities to adopt. Furthermore, the County had the *"demographic variety"* to be the appropriate community in which to first establish an injury control and research center because it was able to provide an accurate reflection of the various populations (i.e., urban, rural, industrial) in the County. The above issues are addressed through the following interview responses:

> *"...Strathcona County could come in quite handy doing that [establishing a community-based injury control and research center] as a **leader amongst municipalities**. We like to think of ourselves as a **beacon municipality** that others could then look to..."*
>
> *"I think Strathcona County has always been **innovative**. They've always been **forward thinking**, certainly in the last ten to twelve years, they've moved ahead with great steps."*
>
> *"Strathcona County has a history of being innovative and **forward thinking** and **willing to take risks** and **willing to try new things** and the people there knew the field of injury prevention and more importantly they had been doing it through their Injury Awareness and Prevention Committee for several years."*
>
> *"It's a really **great leading edge County**. It's a good place because it's got the geography... and also Strathcona County is **a test area** for many products. A lot of consumer products are tested here because of the **demographics**, so it's probably a **logical place** from that perspective."*
>
> *"...I think its **demographics** because its got the variety, which is one of the reasons we wanted to do it [set up an injury control center] because we have a number of truly different populations – not just like different neighborhoods but residential, pure farming, high risk industrial stuff, and regular residential so we've got the whole ball of wax...."*
>
> *"One of the positive reasons would be the **demographics** of the County. It has industry, it has residential, it has rural, we have a variety of EMS, fire, rescue, probably the most versatile areas, and a large variety or a large type of call volume perhaps, and I think that's a good place to start with. You get **an accurate reflection** of what's going on in the bigger picture within a small area."*

II. Fire Station Setting

EMS personnel play a vital role in injury control as they are usually the first persons to arrive at scenes where medical attention is required. *"Quality of personnel," "continuous quality improvement"* and *"logistics"* were three categories of interview responses. "Quality of personnel" referred to the nature of EMS personnel as described by interviewees. They were described as being *"dedicated," "team-oriented," "determined,"* and *"highly trained"* individuals. Interview respondents substantiated the housing of the RICRC in a logical setting with the EMS at the SCES Department (Fire Station #1) by emphasizing the fact that the fire station is the *"prime source"* of data collection and the genesis point of much injury prevention initiatives. Through the following responses the above themes are illustrated:

> *"I think the choice of the fire station has a **great deal of logic** to it. The emergency services here is the **prime source** of where it's[data collection] going to start so why not link it initially. If it were not based here, then it would be another piece to try and pull in to the existing community structure for health and safety."*
>
> *"I like that idea of it being in the fire station, because the fire fighters are typically more **team oriented** and we provide the EMS, it's just as important to us. I think we provide better EMS because of that philosophy of a team oriented sport rather than me and my partner against the world,... we're [EMS and RICRC] all on the same team..."*
>
> *"I don't think there is a better place to live than Strathcona County and have the protection of our emergency services... we are very fortunate to have such a **efficient, dedicated group of people** that look after our fire and emergency medical needs...."*
>
> *"**A fire station is the best place** because they're going to go to that injury, number one. They're going to collect the data, how it came, it's going to be written documentation of where and how the injury occurred, what was involved with the injury, what was assessed and it gives you that first step in being able to collect that information."*
>
> *"I think that's because this [SCES] is where things happen. Because the people that are here are interested and you have statistics and **data that starts here**- especially if you have a motor vehicle accident or heart attacks or whatever you're tracking, whatever the control is going to be, it starts here. They are **an irreplaceable, determined bunch of people here**. When they [EMS personnel] say there going to work with the injury control people, they will stand by their word."*

Respondents, such as EMS personnel, saw a definite benefit to having the Centre located in the fire station, specifically in the continuous quality improvement (CQI) of their roles as EMS responders. Respondents elucidated on the CQI themes of :

- *"data/data exchange"*- The timely communication and dissemination of data, either in the form of injury statistics or efficiency/efficacy studies of prevention programs, was important to responders so as to permit them to explore more efficient and effective means of reducing the frequency and severity of injuries. Having injury statistics would allow them to substantiate the cause of particular injuries and make them more cognizant of their roles and activities. Furthermore, having such exchange of information would then allow them to realign their efforts (as highlighted in *Analysis* phase) so as to make a profound impact in the community.

  The following responses best exemplify this theme:

"...the more data, the more statistics that's collected, it's easier to define and implement an injury control type preventative program and I think the more we work together to trade information back and forth, the easier it would be to establish some kind of viable program."

"Even in our [Centre Coordinator and Centre customer] discussion about airbags and other stuff, we never had that ability to exchange information or locate it.... I can come in to the Centre and say, ' I need information on this injury and this injury pattern,' and you [Centre staff] would be able to retrieve that information. I guess that would be more on the surveillance side, but we never had that ***two-way exchange*** *before."*

- *"public education and public awareness"* – Similarly, with the necessary injury data provided by the Centre, EMS personnel would then be armed with the necessary information to become more proactive by communicating public education and awareness messages to community residents. Being proactive would improve the roles of EMS in that they could take on a *"more active role"* in the community. This interpretation is described through the following responses:

"I think perhaps EMS would move into more prevention, public education, public awareness."

*"... **Community involvement**, being able to take a **more active role** in any of the programs that could come out of this that would work with us."*

- *"need for improved training efforts"* – This theme substantiates the notion of the RICRC being a logical extension of EMS. The expertise and implementation of an EMS-based surveillance system provided through the Centre would be able to provide EMS specific information. Such information can then be transformed into appropriately targeted training efforts for EMS personnel, thus permitting them to take a larger role in preventing injuries. The following responses illustrate this interpretation:

*"...it [RICRC] is a **shortcut**. Instead of spending hours and hours researching, most of the work and information is already here for you at the Centre. Again the Centre is specific... I like the fact it is specific to what I am doing in my job and where I should be putting my efforts in terms of EMS in terms of **training patterns** down the road and that is where we can develop some programs from."*

*"...get **EMS schools** that train these individuals to start incorporating prevention at their **training** level."*

"Logistics" refers to the logic behind setting up the RICRC in the fire station in regards to the nature of the business of injury control and call volumes being mostly medically related as opposed to fire-related. The following responses illustrate this interpretation:

*"The fire station is the **model of the future** where injury control should occur out of. Because the majority of calls in fire stations are not fire related, they're medically related and a lot of medically related calls are injury related. So it only makes sense to put it within that structure."*

"... we are not in the business of injury, we'd prefer to be in the business of injury control."

III. Centre Blueprint

The following is intended to act as a "blueprint" of what the RICRC is designed to look like and function (RICRC Business Plan, 1998).

Scope of the RICRC

The RICRC will act as the first official satellite center of the ACICR. Specifically, injury surveillance development in the County of Strathcona will stem largely from the provincial framework of the ACICR and will aim to bring together the relevant local authorities to formulate a coordinated plan of action.

The Centre addresses injury control through the following four core strategies: programming; research, surveillance and evaluation; information sharing; and education. This will be done in partnership with multi-disciplinary stakeholders involved in injury control to ensure a coordinated and consistent approach (Sharma, 1999).

The Centre will operate using evidence-based research to determine its priority issues (i.e., target injuries such as suicide, motor vehicle collisions, and falls) and strategies. These strategies will be delivered using a data-driven, epidemiological approach. Moreover, these strategies will incorporate multi-faceted approaches to enhance the level of success in reducing injuries, including education, enforcement, engineering and economic incentives.

Mission Achievement

According to the RICRC Business Plan (1998), the Vision of the RICRC is "*to make Alberta Communities the safest communities in Canada to travel, live, play and work in.*" The mission in achieving this vision includes:

- Reducing the incidence and severity of injuries,
- Measuring the effectiveness of the Centre,
- Forming long-lasting, beneficial, regional relationships,

This mission specifically entails improving the health of the residents of the County of Strathcona by reducing injury-related mortality, morbidity, and disability by utilizing a comprehensive

public health approach. Such an approach will include data collection, epidemiology, implementation of community-based prevention programs, education and public awareness, policy development, and evaluation. Primary, secondary, and tertiary prevention, and the integration of all three phases of injury prevention should be addressed by the research, training, and community service outputs of the RICRC.

These mission elements will be achieved through the following principles of operation:

- applying a scientific approach encompassing some of the processes of pilot-testing development (e.g. computerized EMS-based surveillance system), planned implementation, evaluation and dissemination of research results so as to eventually identify gaps and assist partners to address deficiencies, and minimize duplication of activity;
- pioneering the concept of multi-sectoral cooperation and collaboration by establishing a community coalition for injury control and research that builds on current strengths of partners within and outside of the region;
- providing overall leadership for community-based injury control research;
- maintaining sustainability as a health organization that benefits community residents;
- ensuring efficient and effective use of all resources by assuming accountability and fiscal responsibility; and
- respecting the skills, needs and values of partners.

Target Audiences

The target audiences for the RICRC include agencies and practitioners in the four discipline areas of injury prevention, emergency medical services, acute care, and rehabilitation, with emphasis on the first two groups. The RICRC will work with injury control stakeholders in

and around the community to provide them with information, materials, and support for communication about injury control and issues and strategies. However, the ultimate target group is members of the public, from children to seniors, whom are consumers of injury control programs and services and are all at risk for injuries. Where appropriate, public communication will be undertaken by the RICRC through the media and public presentations.

Criteria for Priority Setting

The RICRC will make best use of its resources by taking a centralized approach to service delivery. It recognizes it will not be able to meet all expectations of everyone it serves, so it will go through a priority-setting process. Priorities will be determined as objectively as possible by giving consideration to the following criteria:

- Severity, prevalence and incidence of injury; and
- Evidence and research results (e.g. Effectiveness of intervention strategies and potential for success)

Activities of the RICRC

A sustainable and effective core developed through the careful integration of educational, enforcement, engineering, and evaluation efforts will enable the RICRC to develop into a dominant injury control entity in the Province of Alberta. Core activities of RICRC include the following:

1. Community injury data collection: e.g. vital statistics, census data, DIDP etc.
2. Community Coordination, Leadership, and Administration: e.g. health departments, ACICR, industry.
3. Program Development and Implementation: e.g. Electronic Patient Care Reports, collaboration with Safe Communities.

4. Policy Development: e.g. local and provincial governments (may include enforcement-e.g. Red Light Camera initiative in the County of Strathcona).
5. Evaluation: should be built into every stage of education, enforcement, and engineering so as to accurately determine which strategies are most effective.
6. Public Information and educational programs: target children, legislators, and the public at large (e.g. statistics sheets, public awareness messages etc.).
7. Assure the protection and health of the population by investigating injury clusters or events- i.e., employ an epidemiological approach.

Based on the general Centre goals highlighted in Table 2.3, specific strategies to meet the first year goals can be selected and identified in the form of a plan. Table 2.4 details the strategic plan for the RICRC in regards to four targeted goals- Program Support; Research, Surveillance and Evaluation; Information Sharing; and Education.

Table 2.4- RICRC Strategic Plan

GOAL #1: Program Support	
Objective 1.1	***To establish and maintain a multi-sectoral partnership approach to injury control.***
Strategies:	• Identify and liaise with interested injury control players to discuss regional coordination of programs and services. • Form strategic alliances and collaborative relationships to develop and deliver consolidated and strengthened injury control activities. • Establish linkages with key provincial government ministries to increase coordination and integration.
Objective 1.2	***To support the development of prioritized injury prevention, emergency medical services, acute care, and rehabilitation programs and initiatives.***
Strategies:	*Prevention Strategies:* • Increase awareness of suicide as the leading cause of injury deaths and ensure consistent suicide prevention services are available through the region in collaboration with key players. • To ensure that the data is involved in guide prevention programming. *Emergency Medical Services (EMS) Strategies:* • The training of paramedics and staff of Strathcona County Fire Hall in the use of the electronic patient care reports. *Acute Care Strategies:* • Investigate local acute care facilities to determine their role in a data driven injury control approach.

	Rehabilitation Strategies: • Investigate and develop partnerships with organizations and groups involved in rehabilitation and reintegration of injured individuals into society.
GOAL #2: Research, Surveillance, and Evaluation	
Objective 2.1	***To implement a comprehensive and coordinated injury control surveillance system in the County of Strathcona.***
Strategies:	• Development and revision of an electronic injury surveillance system proposal.
Objective 2.2	***To compile, analyze, evaluate and disseminate timely, relevant, and comprehensive injury control data.***
Strategies:	• Compile, analyze, produce and distribute high quality, comprehensive local injury control data that is relevant, timely and user-friendly. • Respond to data requests from the community. • Develop and distribute, with multi-sectoral players, statistic sheets on injury control and leading injuries.
Objective 2.3	***To conduct, support, disseminate, evaluate, and apply injury control research.***
Strategies:	• Disseminate research results in reports, research rounds, presentations, and publications. • Develop and injury prevention program library of programs implemented (local, national, or international in perspective).
GOAL #3: Information Sharing	
Objective 3.1	***To provide leadership and coordination in building and maintaining information networks among injury control stakeholders and practitioners and ensure consistent information and effective dissemination of injury control information and resources.***
Strategies:	• Develop and maintain a multi-sectoral network of players and contacts in and around the community. • Use technology to disseminate injury control information (e.g. Internet, fax-back system, electronic library). • Develop, disseminate and encourage use of standardized injury control information resources by all sectors / players (e.g. RICRC overview, slide presentations, fact and statistic sheets, articles, public service announcements). • Coordinate information about current, provincial and national injury control issues and be a central resource of information (as in the Injury Prevention Programs Library).
Objective 3.2	***To communicate regularly with media throughout the community to increase their awareness of injury control issues of prevention, emergency medical services, acute care, and rehabilitation.***
Strategies:	• Develop and maintain a list of media sources in the community. • Develop and disseminate communication resources for priority injury control issues (e.g. Fact and statistic sheets, news releases, file photos, position statements, spokespeople, provincial and national comparisons).
GOAL #4: Education	
Objective 4.1	***To collaborate with educational institutions and agencies to develop injury control education for community residents.***
Strategies:	• Aid in development of prevention education programs by providing injury data to focus prevention efforts for educational institutions and agencies (e.g. Safe Communities Coalition).

Source: RICRC Business Plan, 1998

2.5 Discussion

The Systems Approach was a versatile method from which to configure the conceptual framework. This approach delineated particular start and end points to each phase in this study so as to determine Centre establishment progress. From the general structure of the conceptual framework, qualitative methods fit appropriately into the *Analysis* and *Design* phases in order to collect and analyze the data that would define each particular phase. Specifically, the description of each phase was done using semi-structured interviews and document review. Categories and themes were extracted from the data collected to identify the main features of each phase. Moreover, using these qualitative methods successfully allowed comparisons to be made and similarities to be identified between the interviews and documents. Together, interview and document data were able to substantiate Systems Approach elements such as the needs assessment. Conclusions, interpretations, and study implications made from the data analysis are described below.

Analysis Phase

Whether it is at the provincial, regional or community level, the injury statistics presented in this study are indicative of the fact that injuries are not sporadic or episodic events. In fact, injuries follow certain patterns/trends. These trends can manifest in terms of sex, age, and cause/type of injury. This problem is further emphasized by the fact that injury is a predictable and preventable disease when compared to other diseases such as cancer and cardiovascular disease. Because of the predictable and preventable nature of injuries, such trends allow researchers and injury control stakeholders to reduce the frequency and severity of injuries by targeting appropriate populations and injuries. However, even armed with this information, injuries remain a problematic area of the community's public health.

Interview respondents emphasized the nature of the Centre to act as a "catalyst." Having such a "catalyst" serving the community in a unique and sophisticated way, indeed, makes the County of Strathcona a "center of innovation".

Document review data provided essential knowledge of the political, social, and economic environment in the community. Without including such variables into future interventions, resulting plans may be weakened due to politically unrealistic or culturally inappropriate strategies, unanticipated opposition to certain activities may surface, or intervention programs may be duplicative of other community efforts (Gallagher et al, 1993). Such circumstances, if they were to occur, would not be supportive and in alignment with the RICRC's goals and objectives since one of the aims of the Centre is to minimize duplication of activity. In fact, "a true commitment to improving the health of Canadians involves more than reorganization of the health care system; it also involves action on factors outside the health care system that affect the health of the population" (National Forum on Health, 1997). Taking steps to improve the health of people in the County of Strathcona starts from a clear understanding of the factors that affect health, and many of those factors go beyond the health system. In fact, according to the National Forum on Health (1997), "...the better off people are in terms of income, social status, social networks, sense of control over their lives, self-esteem and education, the healthier they are likely to be." Because the RICRC is situated in and serving the residents of the County of Strathcona, geographic, demographic, economic and political knowledge of the community became essential. Knowledge of the community, such as demographics, also allows insight into various areas that may be problematic in regards to injuries and insight as to potential resources that may be available to help design, develop, and implement injury control initiatives. It is also essential to understand how public policy is formulated in the community. To that end, it becomes essential to identify the community members who can influence and authorize public

action on or point media attention to the injury problem and those who can seek funds, who have the power to allocate funds, and how such decisions may be influenced.

Design Phase

As indicated by participants' responses, the presence of the RICRC will shape the future roles of the EMS personnel. This will be done through the efficient collection and management of data and its transformation into useful information are fundamental to a successful CQI program. Moreover, to implement this CQI program, data are necessary to describe customer needs, evaluate performance, establish goals for improvement, and monitor progress. Ultimately, having an injury control center housed in a fire station, and working so closely with EMS personnel, helps contribute information and resources (i.e., computerized surveillance systems) to aid EMS personnel in injury prevention efforts. This information becomes important because it can be later translated into appropriate educational or prevention "teaching moments" by both EMS and injury control personnel at the community level. To that end, SCES personnel indicated a need for a larger, more "proactive" role in injury control. Primary injury prevention by SCES is not a new concept. The fire service pioneered fire prevention, and fire companies spend much of their working time on fire prevention activities. EMS systems, in general, have not been aggressive as the fire service in PIP activities (Kinnane et al, 1997). This may be explained by the " busy" nature of EMS systems. The lack of downtime in some EMS systems raises the question of how primary injury prevention activities can be accomplished by busy EMS systems, such as the SCES. This is obviously another area where the Centre plays an integral role for EMS. Having an injury control specialist at the Centre allows for the Centre to concentrate more upon the PIP activities in regards to program design, development, implementation, and evaluation. The Centre is not intended to take away involvement of EMS but rather focus on more scientific issues related to PIP. This information is then disseminated to EMS personnel. Not only can EMS personnel undertake PIP projects, they can also have an injury prevention role

as collectors and recorders of the raw data collected during the "golden hour" at the scene of an injury. As the scope of EMS service expands, arenas, such as the RICRC, "that are a logical extension of what EMS currently does" should be sought (Spaite, 1997). Ultimately, the Centre acts as a conduit to integrate PIP activities into the acute care role of EMS and to assess the effectiveness of EMS PIP activities. Interview responses generally explicated that through the fire station setting, the RICRC would be better able to perform injury control in that the EMS personnel were highly dedicated and trained professionals themselves who saw the apparent need to reduce injuries and their burden in the community. They were willing to dedicate their time, energy and resources into the RICRC initiative.

In assessing the Design component of the RICRC being situated in a relatively progressive community such as the County of Strathcona, there are some issues that are raised when extrapolating the establishment into other not so progressive and rural areas, especially those areas that may only operate emergency services on a volunteer basis. Though this issue is subject to further study, some apparent implications are discussed below.

One concern that would need attention is the presence of private ambulance firms. These corporations are specifically in the business of providing service for injured persons. Therefore, such groups may not be so willing to provide support for injury control, otherwise, they may encounter financial difficulties. One alternative to addressing this concern would be to address the issue of injury control regionally- i.e. having one main center coordinating the efforts of smaller communities (even ones with private ambulance services). Such centers would then participate in an arrangement similar to the mutual aid agreements for EMS between municipalities (Tintinalli et al, 1996). With such an arrangement, centers would be providing communities data, direction and guidance in injury control. Consequently, in setting up a regionalized injury control center amongst smaller communities, care must be made that the

centers do not detract from their mission and become an enforcement or regulatory mechanism for EMS service delivery. Some services may then view the centers as a threat rather than a partner. Centers should primarily stick to their scientific and community involvement natures.

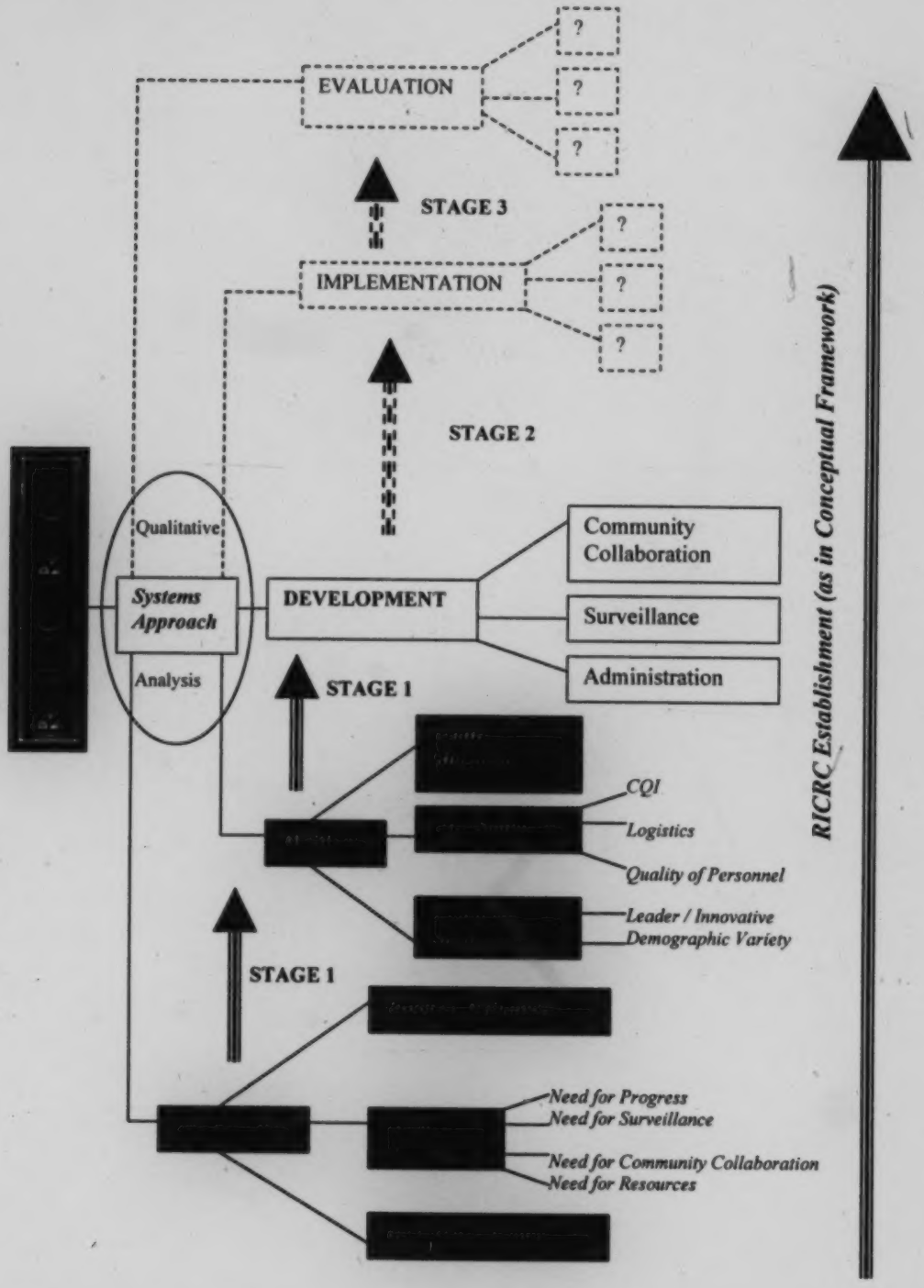
The design of regional centers in smaller communities (i.e., population of approximately 10,000 and less) can play a pivotal role in injury control. Generally, a population of 10,000 residents may generate only one true emergency call a day (Tintinalli, 1996). Naturally, small communities must then be prepared for relatively low call volumes, unevenly distributed during the course of a year. Long distances involved in travelling to acute care facilities, lack of other health care resources, and inadequate communications magnify the problems faced by rural EMS systems. Injury prevention thus contributes tremendously to aiding theses rural systems to deal more effectively with the community's emergency demands. Improved injury prevention efforts (i.e., education, enforcement, engineering) based on accurate epidemiologic surveillance data and use of injury prevention science (i.e., Haddon's Matrix- Appendix II), will have the greatest likelihood of saving lives and reducing morbidity. Moreover, in a setting with increased response times and lower levels of out-of-hospital care, the education of the general public is extremely important (Tintinalli, 1996). Tying up scarce EMS personnel and ambulances with inappropriate calls for transportation of patients who could readily be transported by the family vehicle will potentially reduce the availability of the EMS team for more critically ill or injured patients.

Summary

This study described the *Analysis* and *Design* phases of the Systems Approach in the establishment of the RICRC. The *Analysis* phase appropriately addressed the problem of injuries in the County of Strathcona; the solution to this problem came in the form of dedicated injury control and research infrastructure-namely, the RICRC; and its relevant goals to achieve injury control in the community were determined. The *Design* phase also appropriately addressed its

phase specific issues- the special leadership and demographic qualities of the County of Strathcona; the unique and beneficial housing of the Centre in the fire station which allowed for the natural and logical relationship between EMS and the Centre to develop; and the inherent appearance and functions (blueprint) of the RICRC. The obvious next step is to describe exactly what was done. This step is addressed in another study (Sharma, 1999) that discusses the *Development* phase in the establishment of the RICRC. However, for convenience purposes Figure 2.3 is provided to outline the Systems Approach phases and their specifics thus far, as well as provide some insight into the link with the *Development* phase.

Figure 2.3- RICRC Establishment Organizational Chart



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CHAPTER THREE

Experiences from the Development of a Sustainable Community Fire Station-Based Injury Control and Research Centre

3.1 Introduction

Injury control is an "all-encompassing" approach to the reduction of injury occurrence. It integrates injury prevention, emergency medical services, acute care, and rehabilitative services. Periodically, an injury problem surges to a community's attention, eliciting great concern and empathy. However, in order to achieve progress in injury control, communities need a systematic ongoing injury control strategy to reduce injury-related death and disability. Community-based injury control and research centers are a community-based strategy that can provide a systematic, scientific, and data-driven approach to injury control. In fact, the prevalence of injuries as a public health problem requires community-based programs that are sustainable for the long-term.

In the fall of 1998, Alberta became Canada's first province to establish a provincial lead agency, the ACICR, to address the burden of injuries through injury control. Furthermore, an Alberta municipality, the County of Strathcona (also referred to as Strathcona County), became the first community in Canada to complement the injury control efforts of the ACICR at the local level by establishing the Regional Injury Control and Research Centre (RICRC). Not only is Strathcona County the first community in Canada to have an injury control and research center, but it is the ***first*** community in North America to have such a center uniquely housed in a fire

station providing both fire and pre-hospital emergency medical services (EMS). The motivations behind such a unique housing included devising a sustainable community fire station model that other communities could adopt in order to establish their own dedicated injury control infrastructure to reduce injuries, and that allowed further examination of the injury control system link to EMS (as the RICRC would be a logical extension of EMS).

3.2 Purpose

This paper is a qualitative study of the significant processes (those activities that take time as they occur in many steps) and events (those activities that sporadic and/or periodic, occurring within a definite period of time such as an hour or a day etc.) occurring between May 01, 1998 and April 31, 1999 involved in the establishment of the RICRC during the *Development* phase of the Systems Approach. This paper is part of a larger study in which the other components of Stage I of the RICRC establishment process (*Analysis* and *Design*) are described (Sharma, 1999). The purpose of this paper is to identify and describe the important attributes of Administrative, Surveillance, and Community Collaboration processes and events that contributed to the development and sustainability of the RICRC in a mixed urban/rural community, namely, the County of Strathcona, Alberta, Canada. This paper further identifies the successes, pitfalls, and areas for improvement in relation to these processes and events.

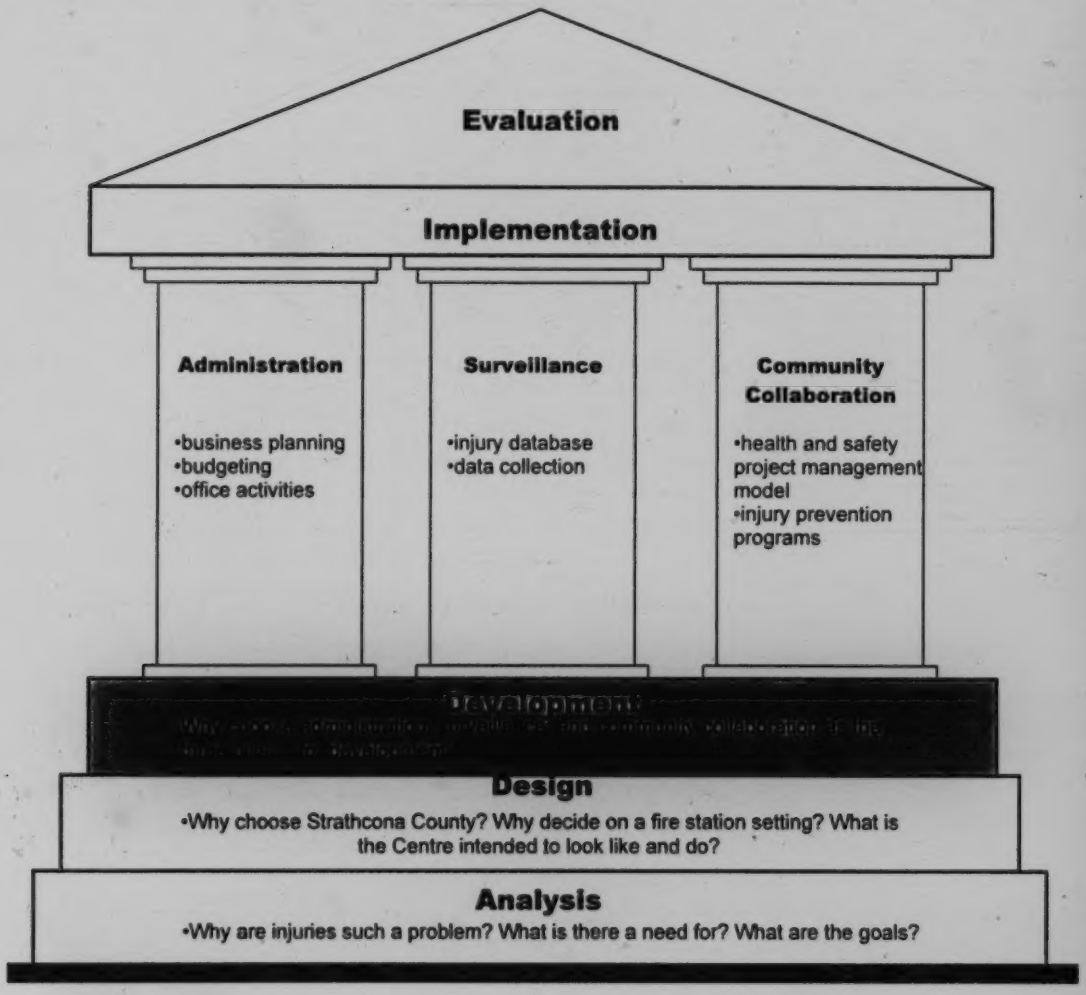
3.3 Methods

3.3.1 Systems Approach

The Systems Approach (Micik and Miclette, 1985; Gallagher, 1993) is a broad-based and versatile way of addressing injury concerns in a "systematic" manner. In other jurisdictions, this approach has been successfully used in the creation of injury prevention programs and other interventions for injury control (Micik and Miclette, 1985). This approach was slightly modified

for use in the establishment of the RICRC, a community-based injury control intervention. Instead of normally applying the System Approach phases of: *Analysis, Design, Development, Implementation, and Evaluation* (Micik and Miclette, 1985) to a specific injury prevention program, this approach was modified slightly to accommodate the establishment of a more grandiose intervention. The establishment of the RICRC is occurring in stages that incorporate Systems Approach phases. Specifically, Stage I of the RICRC establishment focuses on the *Analysis, Design, and Development* phases of the Systems Approach, Stage II addresses the *Implementation* phase, and finally, Stage III of the RICRC establishment process deals with the *Evaluation* phase. A conceptual framework, Figure 3.1, clearly illustrates all the particular phases involved in the RICRC establishment. Stage I is the focus of the present study and its phases of *Analysis and Design* are addressed in another paper (Sharma, 1999), while the phase of *Development* (shaded region) is addressed in this paper. Furthermore, of particular interest to the present study are the three components of the *Development* phase: Administration, Surveillance, and Community Collaboration. The processes and events involved in each component are the foci of the present study. In order to describe this phase, qualitative research methods to select study participants, collect data, and analyze the data were used.

Figure 3.1- Centre Establishment Conceptual Framework



3.3.2 Study Participants

For inclusion in the study, key informants (i.e., interview respondents) had to meet at least one of the following criteria:

- persons who are injury control stakeholders (i.e., key informants) primarily in the County of Strathcona;
- persons involved in establishing the RICRC during the researcher's tenure as coordinator – May 01, 1998 to April 30, 1999; and
- persons intimately involved in the RICRC's design and development pre-May 01,1998

Key informants selected represented three categories: injury control researchers, injury prevention programmers, and Strathcona County department officials. Subjects selected from these categories were chosen because they would represent a scientific, community, and administrative point of views, respectively. "Injury control researchers" included those with some training in injury control or related issues and thus, included public health students, professors, and physicians. "Injury prevention programmers" included those from within the County of Strathcona who were involved in community health and safety organizations or groups. Lastly, "Strathcona County department officials" included County residents employed in either the EMS or legislative fields.

3.3.3 Data Collection

Data collection was performed by the researcher who was acting in the "observer as participant" role (Rothe, 1993). The researcher was in the participant role of Centre Coordinator and was answering phone calls, performed data entry and analysis, wrote reports and other administrative duties; and the researcher always took time to discuss study issues of interest and took notes accordingly.

In terms of collecting and gathering data, the observational approach comprised of: gathering field notes through the maintenance of a monthly journal of events; letters from participants which were collected; and public documents (i.e., official memos, meeting minutes, e-mail or electronic messages, records, and archival material) were collected. The interview approach comprised of conducting semi-structured interviews using audiotape and then transcribing the interview. The recording of information obtained through the aforementioned data collection and gathering methods is referred to as "logging data" (Lofland and Lofland, 1984) and will be described in detail below.

Observations

Observations collected through field notes formed the major part of data collection. One form of field notes usually written after observations was the log (Rothe, 1993). The log included researcher's impressions of events/activities during the day. In order to add some more details of observations immediately after a day's fieldwork was completed, audiotaping was used. Audiotaped accounts of observations made were later transcribed into the log as secondary points (i.e. to substantiate other observations). Another important method used to collect observed data was the chronolog (Rothe, 1993). The chronolog used by the researcher was, in fact, based on the "contact/encounter form" (Appendix V) designed and developed by the CDC (Thompson, 1998). It is a rapid, practical way to do first run data reduction (part of the analysis process to be described in the section 3.3.5) as it was used to record episodes of processes and events as they happen in order during the study period. It can capture thoughtful impressions and reflections. It is a data collection instrument that makes it easy to do a rapid retrieval and synthesis of the nature of the contact/encounter. In some cases, the field notes were taken while the process or event/activity was occurring (i.e., Business Plan drafting). However, when the observations were more unobtrusive, field notes were usually written immediately after an event (Rothe, 1993).

With respect to organizing, field notes were organized by appropriately dating written (e.g. contact/encounter forms, logs, memos, letters and other documents etc.) and audiotaped notes. As recommended by Rothe (1993), field notes were then placed in order into appropriately titled file folders for ease of retrieval.

Interviews

Interviews provided a rich source of data. Interviews were performed by the researcher because they provide an opportunity for respondents to speak their minds about issues they cannot adequately express through other qualitative methods such as on questionnaires, they allow for expansion of ideas and clarifications, and they allow for on-site verification of answers, whether that be with the same interviewee or other respondents to be interviewed in the future (Rothe, 1993).

There were 18 core questions developed for the semi-structured interviews. As this study was about identifying and examining the processes and events/activities involved in developing the RICRC, the interview questions chosen were related to infrastructure building, getting budgetary support, building coalitions, and institutionalizing programs. Some of the questions administered in the *Development* phase were:

- What was your role or responsibility during the development of this community-based center?
- What were the pros and cons during this development period? What would you have done differently?
- Who were the main people involved in obtaining budgetary support for the injury control center?
- How did these people first come together?

- What steps did they take to start getting a budget?
- What have you learned so far about how to obtain budgetary support for injury projects such as the injury control center?
- Of all the steps you took, which would you say were the most valuable in moving you toward developing an injury control center?

Interview Process (Rothe, 1991)

A. Preparation for Entry

After subjects were identified by inclusion and exclusion criteria, the researcher contacted subjects by phone and/or in person to request their participation in the interviews. Subjects were contacted early during the study period (May 01, 1998 – April 30, 1999) and most interviews occurred in the latter stages of the study (e.g. January 01, 1999 – April 30, 1999).

B. Negotiation for Entry

Potential interviewees were provided an information and consent sheet outlining researchers' names and involvement, an introduction about the topic(s) covered, probable length of time required, and promises of anonymity and confidentiality of information obtained (Appendix IV). Moreover, consistent with proper negotiating procedures, after gaining consent from the subject, the researcher stressed that confidentiality would be enforced by cleansing of data, the interview required approximately 45-90 minutes, the interview required one session, the place of the meeting was at the discretion of the interviewee, there would be no repercussions or assessment of blame. If the subject did not give consent to an interview, the interviewee asked for a reason that was then recorded. Of the 17 subjects that were selected as interview participants, 14 (82%) gave consent. 3 subjects (18%) did not choose to participate in the interview citing personal reasons.

C. Entry

A key aspect of any interview is the establishment of confluence or cooperation between the interviewer and interviewee (Rothe, 1993). Much of this cooperation was established due to early rapport building between interviewer and subjects. Participants were made to feel comfortable that the interviewer has "shared knowledge" about injuries, injury control and Center establishment, and that the interview is structured on a trustworthy basis. Interviews were performed at either the RICRC, or participants' place of employment. Participants were phoned in advance of the interview to confirm subject participation. The interviewer answered any questions by the participants to reduce apprehension. The participant was then "warmed-up" with general conversation, background noise was eliminated or reduced, and the tape recorder was placed as close to the subject as possible. Each tape was started by the interviewer in the presence of the participant with the interview number (i.e., confidentiality statement). Throughout the interview, the researcher depended upon elicitation procedures. The right (i.e. most appropriate) question was negotiated at the right time. Leading questions were followed, when deemed proper, by secondary or follow-up clarification questions. Slight topic switching and answer extensions helped acquire maximum data because the participants were able to expand on topics important to them.

D. Exit

At the end of the interview, the participant was asked if he/she would like to add anything which was not covered in the interview.

E. Transcription

Because of the pace of an interview, the act of writing would either slow the interview unnecessarily or cause the interviewer to be selective in the kind and amount of information that is recorded, at the risk of introducing bias. Consequently, tape recording, being the most accurate means of preserving interviews (Horne, 1995), was the method of choice for recording. It was explained to all respondents the need for taping interviews – i.e., taping

gives an accurate record of what they have said rather than having their responses filtered through the interviewer's interpretation. Taped interviews were then transcribed (taking approximately three weeks) into typed form by the researcher. With respect to organizing transcriptions, transcriptions were dated and then placed in order.

F. Data Analysis

Data analysis was performed after all interview data was collected and transcribed. After each interview was transcribed, short notes were made on the transcriptions highlighting significant themes. Specifically, surface descriptions were used to reflect the information the interviewees present according to simple categories or themes (Rothe, 1993). In elucidating surface descriptions pertaining to the *Development* phase of the Systems Approach, the researcher searched for descriptors interviewees used to show points of view which may be favorable, unfavorable, strong, weak, serious, humorous, critical etc., as well as identifying use of syntactical devices such as searching for interviewer agreement.

Interview Data Validity

Interview data were validated in the field (i.e., during data gathering) through the following procedures:

- Probing included strategic inclusion of secondary questions that help clarify original answers and elicit further concerns or descriptions about injury and the Centre. During interviews the interviewer probed respondents with a variety of follow-up questions that clarify the meaning of the original response. Some probing examples are:
  - Are you saying that...
  - Do you mean that...
  - What might be another way of saying that...
  - What is an example...
  - How might that...

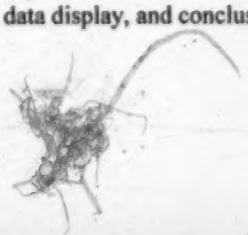
- Interview participants were provided with copies of the transcriptions and any associated data analyses and interpretations for participant validation (Rothe, 1993). Participants' comments about the researcher's writings provided a degree of assuredness as to the validity of interpretations.
- According to Rothe (1993), based on the assumption that the world is a "shared one" in which people intersubjectively understand individual and group meanings, the researcher focused on a response given by an interview participant and asked others about it (e.g. the importance of communication between key players in injury control). By using this process the researcher was more apt to discover the generalized meaning or idiosyncrasy of an answer.

In addition, interview data is often dependent on respondent credibility (Rothe, 1993). Respondent credibility was assured in that the interviewer was able to evaluate the authenticity of a particular respondent by asking himself the following questions (Becker, 1977):

- Does the interviewer have any reason to lie or conceal information?
- Does vanity, expediency or self-image lead an interviewee to mis-state his or her role in the event, or attitude toward a particular issue?
- Do his or her feelings about issues, persons, events, ideologies and the interviewer lead him or her to alter a story or re-interpret the information?

3.3.4 Data Analysis

There is indeed, a defined process to qualitative analysis. Qualitative analysis, as described by Miles and Huberman (1994), is a process consisting of three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification.



The first part, data reduction, refers to the process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in written-up fieldnotes or transcriptions. Data reduction actually occurs continuously throughout the life of the qualitative study. Even before the data are actually collected, anticipatory data reduction is occurring as decisions are made on choice of conceptual framework and the type of data collection approaches. All of these researcher decisions are analytic choices. As data collection continues, further episodes of data reduction occur such as coding, making categories, and making partitions. This study utilized the interview data to support and/or substantiate the data collected by the researcher's observations.

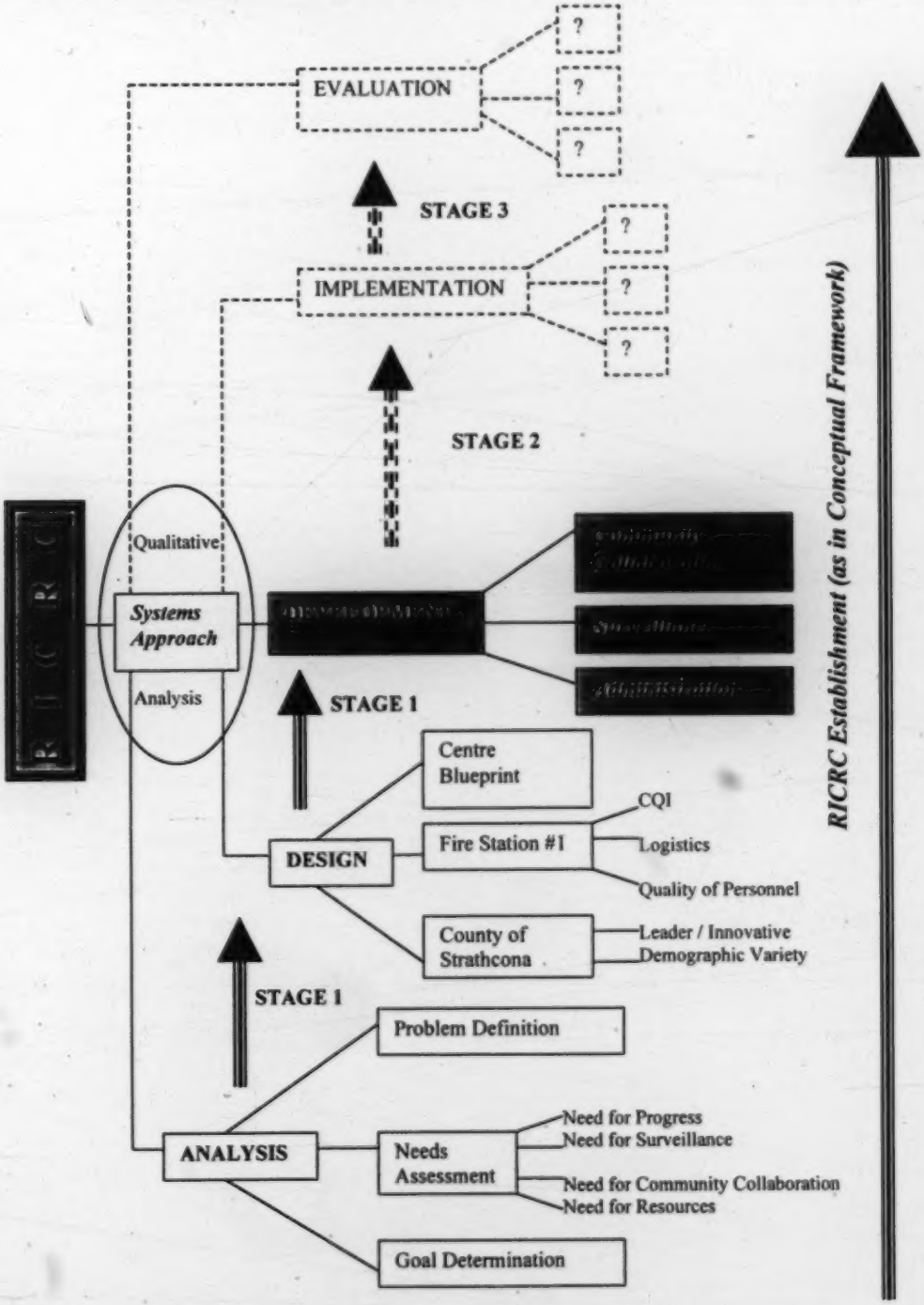
Next, the second major flow of analysis activity is data display. Generically, a display is an organized, compressed assembly of information that permits conclusions drawing. Through display observation, the nature of what is happening is understood. Types of displays include matrices, graphs, charts, and networks. Essential to displays are categories. Categories such as "administration," "surveillance," and "community collaboration" are the labels that are put on intellectual "bins" (Miles and Huberman, 1994). Figure 3.2, an organizational chart, outlines this study's categories in the context of Stage I of the establishment of the RICRC. This chart outlines the link between the Systems Approach phases of *Analysis* and *Design* that are discussed in another paper (Sharma, 1999), and *Development*. Basically, the *Analysis* phase was performed to establish what the problem in the community was, identify the community specific needs, and determine the goals for the solution to the problem. The *Design* phase, on the other hand, described the location of the RICRC in the County of Strathcona and its unique setting in the fire station; as well, it provided a blueprint of the Centre as to its inherent functions.

Lastly, the third stream of analysis activity is conclusion drawing and verification. From the onset of the study, decisions as to the meaning of events through the noting of regularities and patterns were considered in order for accurate conclusions to be drawn and verified. After

observation and interview data were analyzed separately using surface descriptions, similar categories and themes were identified and described for the *Development* phase. This similarity of categories and themes among observations themselves, interview responses themselves, and among observations and interviews addressed the issue of data reliability. Specifically, this similarity of responses within the study time period is referred to as synchronic reliability (Kirk and Miller, 1986; Rothe, 1993).

This study sought to identify a collection of instances from the observational and interview data. This form of analysis and interpretation, similar to surface descriptions (Rothe, 1993), is known as categorical aggregation (Stake, 1995).

Figure 3.2- RICRC Establishment Organizational Chart



3.4 Results

This section provides a descriptive summary of the *Development* phase for the RICRC. It is divided into the three *Development* categories of: Administration, Surveillance, and Community Collaboration. These three foci for the *Development* phase were not only revealed upon analysis of field notes and interview data, but in fact, they appropriately reflect the needs identified in the *Analysis* phase as well as address some of the strategic goals (i.e., Strategic Goal #2- Research, Surveillance, and Evaluation and Goal #3- Information Sharing) of the Centre that are described in the *Design* phase. Specifically, an area such as administrative duties combined the need for resources (*Analysis* phase) and many of the Centre functions outlined in the *Design* phase into one distinct category (Administration), while areas such as surveillance activities and community collaboration efforts required more detail and thorough exploration and were thus given their own respective categories (Surveillance and Community Collaboration). Data collected through field notes, observations and interviews ultimately substantiated the choice of these foci for the *Development* phase.

Moreover, the three main categories have each been further reduced into the sub-categories of: Successes, Pitfalls, and Areas for Improvement. Within these sub-categories, various themes emerged and were elucidated. Because of the observer as participant role, successes (positive outcomes), failures (negative outcomes), and areas for improvement (areas requiring further attention and progress) are defined from the perspective of the participant (Centre Coordinator).

The results from the contact/encounter form illustrate the nature and number of contacts and encounters with and by the RICRC that were observed during the study period. Tables 3.1 and 3.2 illustrate the number of contacts/encounters by month and by category. Centre staff (i.e.,

Coordinator and summer research assistants) initiated contact 57% (38/67) of the time, while the remaining 43% (29/67) of contacts/encounters were made by individuals, groups, and agencies at the local and provincial levels. The months of September 1998 and February 1999 were observed to be slightly busier months. This form was also useful in that it allowed examination of the resourcefulness of the Centre when others have initiated contact. For example, out of the 29 "Other" contacts/encounters, two were a "request for volunteer support," four were a "request for injury information," five were a "request to participate in a program," six were a "request to do a presentation," six were a "request for data/statistics," and another six were a "request for other support."

Table 3.1- Contacts/Encounters by Month

Month	Number of contacts/ encounters
May 1998	6
June 1998	8
July 1998	3
August 1998	2
September 1998	**10**
October 1998	4
November 1998	6
December 1998	2
January 1999	4
February 1999	**12**
March 1999	7
April 1999	3
1998-99 TOTAL	***67***

Table 3.2- Contact/Encounter Categories

Category	Number of related contacts/encounters
Administration	38 (57%)
Surveillance	18 (27%)
Community Collaboration	11 (16%)

3.4.1 Administration

Many themes capture the nature of the administrative duties conducted at the RICRC. These themes include: Obtaining Budgetary Support and Other Funding Issues, Need for a Comprehensive Plan, Staffing and Training, Receiving Media Attention, and Regular Office Activities.

I. *Successes*

A. Obtaining Budgetary Support and Other Funding Issues

In the process of data collection it was important to identify the key players involved in obtaining budgetary support (during the pre-May 01, 1998 to April 31, 1999 study period) so that a community-based injury control and research could be established. Interview data were essential in this identification. Respondents involved from the conceptualization of the Centre establishment project were best able to provide direct, concise and confident responses to questions concerning the area of obtaining budgetary support. Respondents indicated that certain key players who were *"highly motivated"* and *"enthusiastic"* toward injury control in the County of Strathcona brought themselves together to prepare the first budget for the Centre. They then successfully proceeded to both local and provincial governments where they were able *"to put injuries on the agenda."* As a result, the Centre was able to receive funding. The final amount of funding awarded to the Centre, including funding for the surveillance project (described below), totaled approximately $96,400.

In October 1998, it was brought to the attention of the Centre Coordinator by a Strathcona County Emergency Services (SCES) department official that the County of Strathcona's Community Lottery Board (CLB) administered funding to community projects regardless of type and nature of project. Through the advice of this department official, the Coordinator was recommended to another County department (Parks and Recreation) official to obtain further application information and support. The support received from Parks and Recreation was in the form of application style and content development. An application was finally submitted on behalf of the RICRC for funding support on an injury surveillance. In December 1998, the application proved successful as the CLB granted the RICRC project funding support in the amount of $11,400.

B. Addressing the Need for a Comprehensive Plan of Action

Once the RICRC had finalized its budgetary concerns in late June 1998, it was necessary to chart a course the Centre would take in regards to injury control and research over the next year. Thus, there was an apparent need for a comprehensive plan of action. Therefore, a business plan was drafted. The business plan was not an event but rather a process. The process involved research, recommendations from key players, proposal drafting, revisions, and then final approval. The process itself took approximately one and a half months. An important part of this process was the involvement of key players such as provincial organizations like the ACICR; community groups, agencies and departments; and injury control researchers. Their involvement was integral in performing an *"environmental scan"* of the injury problem, the injury prevention initiatives presently being performed, and identification of the *"deficiencies"* or *"gaps"* within the existing community structure designed to handle injury prevention. In addition, their involvement streamlined the process of detailing various components of the RICRC Business Plan such as the first year critical path of work that needed to be done, the strategic plan which highlighted the four major areas of Centre concentration (Program Support; Research, Surveillance, and Evaluation; Information Sharing; and Education), the criteria for priority setting, and the core operational budget (Sharma, 1999; RICRC Business Plan, 1998). The success in drafting the business plan helped bring potential community collaborators (described in the Community Collaboration section) together. Ultimately, because the necessary time, energy and effort was placed into drafting a comprehensive business plan, it came as no surprise to the Coordinator that it was approved unanimously when presented to County of Strathcona Council.

Success in developing the RICRC Business Plan for 1998-1999 was initiated with the aid of the ACICR. Because the RICRC is to be a community satellite center of the ACICR, it was important that RICRC goals and objectives be aligned with the provincial body to promote a cohesive and integrated working relationship. For this reason, the RICRC's Business Plan was

modeled after the ACICR Business Plan. Of course, due to the very nature of the ACICR, in that it is a provincial body having more resources (e.g., funding and staff) than the RICRC, the RICRC Business Plan needed to be tailored, in regards to the aforementioned strategic plan and budget, in such a way so that the Coordinator could align the Centre's plan with the Centre's goals so as to allow for the greatest chance of achievement.

C. Staffing and Training

Injury control starts with the Coordinator. It was apparent that because the Centre's mandate was to strengthen and coordinate injury control initiatives by providing community injury stakeholders with scientific information and assistance, that the Coordinator, presently and in the future, will have to have certain skill sets. There is indeed a science to injury prevention and control and hence, it cannot be done by the layperson. "Responsible, motivated and highly trained people are needed to handle the enormous task analyzing injuries; designing, developing and implementing programs; and evaluating those interventions" (Francescutti, 1999). To that end, it is not enough that the Coordinator be able to handle only administrative duties (like those indicated in the Regular Office Activities section below), but also be able to mobilize community resources and act on, manage and organize the requests of the community in regards to injury information, injury data, intervention efficacy and efficiency, and prevention program evaluation. To be able to respond to such requests, skill sets necessary for the ***most appropriate*** Centre Coordinator include a knowledge of epidemiology, physics/biomechanics, community mobilization, and program planning to name a few. Obviously, there are many skill sets required by the Coordinator, but as one respondent indicated,

> *"finding a **generic person** who has all the skill sets is **difficult** because there are not to many persons like that out there."*

In late May 1998 one of the key players was able to provide the Centre, at no extra expense to the RICRC, with set-up assistance. Because of the involvement the University of Alberta has with this project and the County of Strathcona, the assistance came in the form of a University of Alberta medical student. The assistance provided contributed to the early success of the RICRC in completing the Business Plan, drafting a proposal for the implementation of the electronic patient care reporting system, setting up the office, setting up an injury library at the RICRC, and conducting qualitative assessments (surveys) of the electronic patient care reporting system with local paramedics and emergency medical technicians (EMTs). In addition, having such assistance allowed for added input in regards to a continuing informal evaluation of Centre growth. In other words, the Coordinator and the assistant were able to plan regular meetings (e.g. twice a week), set up priority lists, and evaluate feasibility and utility of short-term and long-term plans and projects. Having the assistant's feedback in meetings allowed the Coordinator to evaluate, since a previous meeting, whether progress has been made (i.e., are activities happening according to schedule?). Interestingly, the Centre was not the sole benefactor of receiving such assistance. In fact, the Centre and the County of Strathcona acted as a training ground for the medical student in injury control.

D. Receiving Media Attention

"Media attention significantly contributes to increasing an awareness of both the injury issue and the importance of prevention" (Cassady et al., 1997). In October 1998, in the first issue of the ACICR's provincial newsletter, *Injury Control Alberta*, the RICRC received front-page coverage. The article entitled, "Regional Centre in Strathcona County," submitted for publication by the Coordinator was published in the newsletter which, because of its province-wide distribution, was able to inform other stakeholders in injury control around the province of the RICRC's unique presence.

At the local level, in November 1998, the RICRC also received much attention as the RICRC Coordinator was interviewed by both County of Strathcona newspapers, the *Sherwood Park News* (according to Sherwood Park News, distribution is approximately 17,900 in Strathcona County; 98% annual average readership) and *Strathcona County This Week* (according to *Strathcona County This Week*, distribution is approximately 22,000 in Strathcona County; approximately 80-90% annual average readership). The November 25, 1998 issue of the *Sherwood Park News* entitled, "Injury control pilot project for County," (McGraw, 1998) was also successful in raising attention to the injury problem. It aptly acknowledged that the Centre "[was] attempting to change the public perception of injuries as unpredictable, everyday occurrences," to those that can be predicted and prevented by way of the research results obtained through the use of "technology [that had] given the RICRC access to track patients from the scene of the injury to the point of rehabilitation, thus setting the groundwork for prevention" efforts in the community. The article was also able to successfully illustrate the nature of the community, in that with the establishment of the RICRC, "Strathcona County is once again breaking new ground in an effort to make [the] community a safer place to live, " and is able to "establish a coordinated effort" for injury control programs with community groups such as the Safe Community Coalition of Strathcona County and SCES. The other article appearing in the November 27, 1998, *Strathcona County This Week* article, "County first in province with injury centre," (Lau, 1998) received front-page coverage. The article was considered a success because of the attention it brought to acknowledging injuries as a "neglected epidemic," the fact that "injury…was the leading cause of death in the province [in 1997] for people from infancy to age 44," there was now a community-based infrastructure in place to address this disease, and the nature of the sophisticated surveillance system the Centre would be implementing in order to collect and analyze injury data that could be later disseminated to "emergency services, police, and other community groups [in order to] structure injury prevention programs specifically geared to problem spots."

E. Regular Office Activities

Field notes revealed that some of the office activities conducted on a regular basis that proved successful included:

- Approval of the use of University of Alberta logo for letterheads, business cards and brochures to establish the academic link between the Centre and the university.
- 80% (33/41) attendance rate to all scheduled meetings. Meetings included introductions to community groups and agencies, and County council. Also, meetings such as those at the Alberta Legislature (Standing Policy Committee meeting for Bicycle Helmet Legislation) and events like the ACICR official launch provided ample opportunities to meet the policy makers in the provincial government such as the Minister of Health and Minister of Municipal Affairs. This is important in "placing a face with a name (and mission)."
- Creation and organization of monthly and quarterly reports, day-timer log entries, and audio tape recordings to document the progress of the Centre. These items are essential in collecting information for future Centre evaluation studies.
- Set-up of the Centre's injury library through the collection, organization, and maintenance of injury control literature (e.g., books, research papers, posters, and videos). Many EMS personnel frequently requested injury control information from the library such as information on motor vehicle collisions.
- Presentations made on the RICRC and the computerized EMS-based surveillance system (Strome, 1998) to community groups such as the Safe Community Coalition (October 1998), at the regular teleconferences held by the ACICR (June 1998), and abroad such as at the British Columbia Injury Prevention Conference (November 1998). The presentations at the ACICR teleconference and BC Injury Prevention Conference were especially important as they were opportunities to identify others in the province and abroad who were working on similar injury prevention projects. They provided opportunities to begin the collaborative

process. Presentations were also made at community events such as the Community Awareness and Emergency Response (CAER) Fair (October 1998) and the Strathcona County Safety Fair (January 1999). At these safety fair events, the RICRC held booths to provide information on nature of the Centre and the surveillance system. It was recorded that at the CAER Fair, 29 people attended the RICRC booth over a four hour period and made inquiries into why injuries were a problem, why there was a Centre, what types of injuries were most prevalent in the County of Strathcona, and the utility and accessibility of the hand-held computers in regards to electronically recording patient care information. At the County Safety Fair, 63 people attended the RICRC/ACICR booth and asked similar questions as indicated before. This inquiry by County residents provided the Centre with the much-needed feedback in relation to increasing awareness about injuries and the efforts of the RICRC. To that end, such presentations were successful.

- Centre Coordinator volunteered at the 1998 National Health Care Workshop Conference in Edmonton, Alberta, Canada as the Presiding Officer and Session Manager at various sessions including an important session by the Provincial Health Council of Alberta in which the Council emphasized the need to attend to the problem of injuries by way of a shift from injury prevention to injury control. The Centre was able to obtain important literature from the Council (Provincial Health Council's Report on Injury Prevention) to substantiate the Centre's establishment (Sharma,1999).
- A web site that was created by the Coordinator for the RICRC. There was a long process of initial design and development. The impetus behind setting up a web site was for increased awareness of the presence of a unique strategy to address the injury problem at the community level. Within three weeks after uploading the web site on to the Internet, the RICRC web site (http://meltingpot.fortunecity.com/romania/628/RICRC.html) received 106 "hits".

II. *Pitfalls*

A. Obtaining Budgetary Support and Other Funding Issues

Interviews helped identify some hurdles prior to obtaining the funding for Center establishment. It appeared that a lack of community education or awareness in that injuries were a problem and that they could be reduced was identified. One respondent indicated that one barrier to creating the injury control center was

> *"**Convincing people** (legislators) that injuries were a problem. Convincing people that injuries could be predictable and preventable and convincing people to put resources into an area that no one had put resources into before."*

Another respondent acknowledged "political barriers" as an obstacle:

> *"When you are talking to organizations that are doing injury research and injury prevention—it's like singing to the choir and so they don't take any convincing at all. However, those people who have been the naysayers have a much louder voice. It does become **harder to mobilize resources**...."*

Politics played a very big role and for this reason it was better to try to avoid "bureaucratic red tape" by not working in a "top-down" approach. Such an approach might have resulted in some frustrated and angry County employees. As one respondent stated,

> *"...this [top-down approach] would have most certainly resulted in having no one buy into the project because people like the paramedics and EMTs do not like having things shove down their throats...."*

Instead, working with key players and moving "*up the chain*" proved more efficacious in terms of producing buy-in by individuals, groups, organizations and government.

Many problematic areas arose during the finalization of the budget and receipt of the $60,000 from the Office of Municipal Affairs (Alberta Government). The main problems (i.e., finalization of budget details, such as appropriate line items, and total funding allotted) had their roots in a lack of communication between certain integral parties and key players involved. The RICRC was unsure of the complete amount being awarded for its establishment, whom was involved in the allocation of funds, and accountability for the funds. Also, once the Coordinator started in May 1998, it was apparent that there were some already "promised" funds to be

disbursed for pre-May 1998 expenses that were not known to the Coordinator at that time. These expenses would naturally cut into the available budget of the Centre. This lack of communication regarding funding information provided some obstacles as initial development plans were delayed by almost two months. The Coordinator's monthly journal for May recorded that such

> *"budgetary issues that have taken a month, and even more to resolve, could have been finalized in approximately a two week time period provided there was some better organization in [obtaining] funds."*

This sentiment was primarily due to the fact that the $60,000 Alberta Municipal Affairs funding was being held by another community safety organization. Similar to what was mentioned before regarding political barriers, such events dealing with *"bureaucratic red tape"* created much frustration and tension among individuals and groups. As one respondent stated,

> *"**Bureaucracy** had a lot to do with it and the money was promised but because of **a lot of red tape**, it was never there. So I was never convinced that it (Centre establishment) was going forward and it got **frustrating** not knowing for sure where the future was going to end up and having the community members so excited and thinking that this Centre was going to be operational tomorrow..."*

Only later was it accurately communicated to the Centre that government funds could not be directly allocated to an existing government agency such as the SCES in which the RICRC was housed. Furthermore, this reallocation of funds raised accountability issues between the Centre and the community safety organization. The organization, being the "beneficiary" or "holder" of the funds, saw themselves as being responsible for the funds even when the use of the funds was not theirs. "Turf" issues became apparent and resulted in further delay of funds to begin operationalization (i.e., purchase of office equipment etc.) of the RICRC.

This sub-theme of *"communication,"* or rather *"lack of communication,"* in regards to the funding, was evident not only from the perspective of the RICRC, but the interviews indicated it was also evident from the perspective of the community safety organization:

> *"I don't think it was quite so much miscommunication, it was probably more **missing communication**. That's probably the key, the **lack of understanding** on many things that were happening."*

The Coordinator was informed that the *"lack of understanding,"* from the perspective of the organization, initially stemmed from the time the Centre idea was conceptualized and presented by the key players to the safety organization. The concept of an injury control center was not understood, nor accepted, by many members in the organization. This lack of communication and understanding was due in part to the use of language. The use of scientific terminology like "epidemiology," "PCRs," "injury surveillance systems," "program efficacy" and "efficiency measures" were all relatively foreign terms to many of the members who may not have had or recall scientific/research training or be aware of the latest technological advances entering their very own community. Moreover, a lack of communication became evident in members not having a complete understanding of the nature of this injury control center as being strictly a University of Alberta, Department of Public Health Sciences *research* project. It was not until a safety organization meeting held in mid-June 1998 and attended by the Coordinator, that these communication difficulties were eliminated. The Coordinator answered all queries and addressed all concerns pertaining to the Centre and the allocation of funds. Once the organization was content and an understanding achieved, an agreement was reached between both parties in regards to the disbursement of funds and accountability for the funds.

Pitfalls related to other funding issues were in regards to obtaining Centre-sustainability funding. Another application was submitted by the RICRC to the CLB for basic infrastructure (i.e., payroll, travel, computer expenses) funding so that the Centre could continue being a resource to the community. An application for $20,000 was rejected by the CLB. This was not a surprising result as it was well known to the Coordinator that it was normally easier to obtain funding for specific projects, as the Centre had already received, than for infrastructure establishment or sustainability.

B. Need for a Comprehensive Plan

The only item that made it difficult to complete the RICRC Business Plan was the relative delay in the accounting of total funds initially awarded to the Centre due to the communication problems between key players.

C. Staffing and Training

The allocation of more funding to the Centre would have allowed the Centre to hire more staff and train them so that Centre efficiency could be increased allowing the RICRC to produce more deliverables (i.e., epidemiologic studies, information sharing) to be disseminated to interested community injury control stakeholders. The problem associated with hiring more staff, or rather appropriate staff, is *"lack of appropriate training"* and is exemplified by the following interview response:

> *"There are **very few people that are properly trained to this stuff**, so you end up putting someone in who doesn't have the skills sets to do it properly or you end with someone who might be good at doing one thing but not good at doing everything. What you need is somebody who is generically trained who can do everything, and we're never able to find those people."*

The need for appropriately trained staff was reiterated by another respondent who indicated that due to a lack of appropriate training there is no genesis of new ideas.

> *"...They continually **keep reinventing the wheel**, but not reinventing at a higher level. It's like the same stuff that keeps coming back over and over again."*

Thus, *"specialists"* in the field of injury control or public health to address health and health-related concerns in a scientific manner are needed. In the words of one interviewee,

> *"if you don't have someone like an **epidemiologist** watching it [the injury problem], [then] you don't see counter trends sneaking up on you until it's too late."*

III. ***Area(s) for Improvement (Lessons Learned)***

Communication is one definite area for improvement. One respondent recommended that the RICRC continue to

> *"**keep the lines of communication open** and make sure all the people involved in the EMS, if that's where you're going to go into, know what's going on. Make sue that the **information is filtered down to everyone** and not just stop at the management level."*

Future Centre sustainability funding is contingent on present use of funds. Majority of expenses were directed at payroll (> 55,000), surveillance equipment rental (>$5,000), office supplies and equipment (>$4,500), and conferences/travel (>$2,000). Though present funding was used wisely, there are areas for improvement or suggestions for future use of dollars. At the end of the study period, the RICRC and SCES were looking into securing future funding. Three options were identified: 1) blended funding- this would include provincial and local government support, as well as the support of industry in terms of project development and implementation funding; 2) hiring of an appropriate Centre Coordinator from within the County of Strathcona corporate infrastructure; 3) hiring a Coordinator (someone to perform the administrative tasks only) and then with specific project funding from industry, hire trained "Project Managers" to implement and evaluate the projects. Future studies will have to determine the effectiveness and efficiency of each.

A service goal of the RICRC is to provide educational and consulting services. The rationale behind this is that there is a need to increase the base of professionals trained in the field of injury control. It is important that opportunities are developed for the purposes of supporting advancement in the field of injury control and building knowledge and skill levels that will be invested in the community. Areas of improvement include providing consultative support, developing injury prevention resources that are requested by Centre customers, and increasing knowledge in the area of effective intervention strategies to program evaluation initiatives

conducted by the Centre. The percentage of Centre customers who are satisfied with the quality of education or consulting services and tools received could be the performance measure.

3.4.2 Surveillance

Helicopters, fixed-wing aircraft, snowmobiles, and other vehicles are among many "tools in the EMS toolbox" (Tintinalli, 1996). Similarly, one of the guiding motivations behind the establishment of the RICRC, is for the creation of a "tool-box" for state-of-the-art surveillance tools/instruments like the computerized EMS-based surveillance system designed and developed by Strome (1998) at the University of Alberta, Department of Public Health Sciences. The RICRC builds on the existing surveillance work done by Strome. As Strome (1998) has indicated, it is not so much that sophisticated surveillance systems can be designed and developed, but rather, it is more important that they are put to use in providing community injury control stakeholders accurate, accessible, reliable and timely data on injuries so that effective measures can be taken to reduce their occurrence and severity. To that end, the surveillance category is highlighted by the following themes: Aiding in the Implementation of an EMS-based Surveillance System, and Routine Injury Data Collection from Other Sources.

I. *Successes*

A. Aiding in the Implementation of an EMS-based Surveillance System

After budget and business plan finalization, the Coordinator spent the first four months acquiring the necessary hand-held units. This unit acquisition process took the time it did due to budget limitations and cost containment reasons. The Coordinator negotiated the lease of units with numerous Canadian and United States manufacturers and distributors. In August 1998, the successful lease of two Fujitsu Stylistic™ 1200 units was accomplished at a very appropriate cost that would not in any way jeopardize future RICRC spending. The units were then loaded with

the necessary EMS software. The acquisition of these units was important because the Centre acted as a link to the SCES EMS personnel who are the users of the system. With the units, they were able to provide feedback in regards to system modifications (i.e., system use, accessibility, and friendliness). The RICRC relayed this information to those involved in system design, development and marketing.

Further successes also resulted from the acquisition of the units. A manual for the software version at that time use was developed by the RICRC. Training and information seminars on the system (software and hardware) were also developed and conducted by the RICRC for EMS personnel. In addition to the seminars, preliminary evaluation surveys were drafted by the RICRC to measure the system utilization response. Such surveys once again enabled dialogue between the Centre, SCES, and system developers/researchers as to where improvement modifications could be made. Such dialogue also helped to re-establish the previously lost motivation and enthusiasm EMS personnel had for the system. The system also received local media attention (as already described in Administration section). By emphasizing the use of sophisticated technology, the community newspapers were integral in informing community residents as to the level of attention being directed towards injury reduction, patient management, and data collection. The media's involvement was integral to the point that they began to use the Centre as a resource for injury statistics (e.g. RICRC providing snowmobiling injury statistics for local newspaper article) and surveillance system development and use progress. Thus, the Centre, through its aid in the system implementation, was able to successfully obtain some media advocacy in regards to injuries in the community.

As already mentioned, the RICRC is a conduit through which a sophisticated, state-of-the-art computerized EMS-based surveillance system will be implemented and utilized for injury surveillance. The computer at the RICRC had been successfully configured with an injury

surveillance database. This Microsoft Access™ database would be used to upload all necessary injury data from the EMS surveillance system so as to perform epidemiological investigations of injury occurrences within the community. As technology advances, so will the database. For now, the database is simplistic in its use for those familiar with Microsoft Access™ as it can provide information on the minimum injury data sets such as the basic epidemiologic elements of person, place, time, in addition to information about the nature, cause, and outcome of injury. Therefore, the County of Strathcona now has a Centre that can provide some of the basic tools (e.g. surveillance system and database) necessary to conduct further epidemiological research and consequently, provide the support required to strengthen and coordinate injury control initiatives within the community.

It is not so much that a community has the presence of surveillance systems and injury databases, but it is the effective use of them. To that end, further to being able to analyze surveillance data, the Centre has been successful in disseminating surveillance data in various formats that are meaningful to EMS personnel, policy makers, and other injury control stakeholders. Data and results of data analysis were made available in an attractive and accessible format to all injury control stakeholders. Technical language was avoided. Charts and other visual devices posted in the RICRC office, distributed to other groups, and presented at numerous meetings and presentations helped make statistical presentations more comprehensive to non-specialists. Colorful presentation-style graphs, tables, and pictures were produced to successfully illustrate injury occurrences and patterns within the community. The need for such presentation formats was illustrated by one respondent through the following:

> *"Graphs, figures, tables. Things that are at a grass root community level so people can understand easily what they mean."*

B. Routine Injury Data Collection from Other Sources

Centre surveillance success also involved working with existing data sets. Often, data collection and surveillance activities are strengthened through working relationships with agencies that maintain surveillance systems in specific fields, such as traffic safety, emergency medical services, law enforcement, alcohol and drug prevention, disability prevention, criminal justice, economic opportunity, education, recreation, or social services. Using injury data already collected by other organizations proved to be less complicated, less expensive, and less time-consuming than undertaking data collection with the limited staffing and funding at the RICRC.

The Coordinator was able to form data linkages with outside organizations to add supplementary injury statistics to those already collected by the EMS system. Contacts were made with the Medical Examiner's Office, Fire Commissioner's Office, Alberta Labor, County of Strathcona Royal Canadian Mounted Police (RCMP) Detachment, and the Suicide Information and Education Centre (SIEC). In addition, Alberta Health (inpatient hospitalizations) and Vital Statistics (deaths) information tapes were released to the ACICR, and therefore, by being an ACICR satellite center, the RICRC was able to retrieve injury data from these important sources.

Obtaining data from sources was not a simplistic task as attention was given to data requests made in regards to variables, time periods, nature of injury, cause, mechanism, location, gender, and age. Some of the reports were observed to be quite exhaustive (in reviewing). For example, Medical Examiner's reports tend to be quite exhaustive as they include many external reports within them. Some of the reports included in the case files are: Certificate of Medical Examiner, Toxicology Report, Autopsy report, Police report, fire report, hospital reports, death certificates (Interim and/or Final), Transportation bills, Occupational Health and Safety report, and the Fatality Inquiry Information report.

The emergence of injury surveillance data, in regards to data *"quality"* and *"quantity,"* in the fire station caught the attention of most SCES personnel. For example, one respondent indicated:

> *"We had no access to that before. I mean, we had some stuff, but we didn't have the **in depth research** that you guys [RICRC] have been able to do here and provide back to us."*

II. *Pitfalls*

A. Aiding in the Implementation of an EMS-based Surveillance System

The main pitfalls were related to the research and development arm of the system. Because research and development can be a naturally extensive process, there was a decrease in the motivation and enthusiasm by system users. Users were becoming *"frustrated"* with the time required to implement the system. In respondents' words,

> *"I think **apathy** has been the biggest issue. People don't care anymore, and **if** and **when** we get it in our hands, it's going to be a big job convincing them to use it now. When we first initiated it, people were willing to put their hands on it...."*

The Coordinator frequently had to make the users understand and appreciate the time involved in developing a tool that they will enjoy using without major problems. Throughout the study period, this proved to be a laboring process that resulted in memorandums being sent and informing personnel as to the progress of the system.

Information and training seminars could not be delivered to all necessary personnel. This was a pitfall because it resulted in fewer numbers of personnel receiving information on the system. The fact that not all seminars could be completed was primarily due to the nature of EMS. EMS personnel were frequently dispatched before and during planned seminars thus making it difficult to convey important training and information.

B. Routine Injury Data Collection from Other Sources

Being able to routinely collect data from the various sources proved difficult, as many organizations do not have the funding or the staffing necessary to carry out regular data analysis. This proved to be the case with the County of Strathcona RCMP detachment. However, though a lot of time was required, detachment approval was granted after a written request was made by the RICRC for specifications on data requirements. Some data sources such as the Fire Commissioner's Office could provide data upon request immediately, others could not do so because they maintained their own schedules of data release (i.e., release of data on a quarterly, semi-annually or annually). Receipt of data requests in an untimely manner does not ensure accurate and timely analysis. The other problem in obtaining regular reports was that the databases housed by the sources were not capable or sophisticated enough to handle specific data elements requested by the RICRC. Consequently, the RICRC had to receive reports that were not appropriate (due to inconsistency in data variables provided among sources) for proper analysis.

Existing sources have their own disadvantages. It was observed and recorded in the field notes that some data sources may lack variables of major interest, be incomplete, not cover the appropriate geographic area, not be computerized, not be in the desired format, be of uneven quality, and be difficult and costly to manipulate. They may also create problems regarding confidentiality of records and linkage of data. Despite the disadvantages of using existing data sets in the present study, this was the most sensible approach to employ. It is however, not an approach that was taken blindly. There are several critical questions to ask in evaluating possible data sources. Data providers were asked to describe their data collection objectives, data sources, the data collection process, the elements collected and their definitions, and the way the data are managed.

It was observed that data that was not linked, ultimately, did not accurately portray a true picture of the injury problem which is so important especially at the policy making level. For this reason, the data from all the sources were analyzed and compared to identify any potential patterns. This was found to be a difficult task even with a few reports because, as already mentioned, the variables that were examined were not general to all sources and the manner in which data was collected from each source was in itself different. An example of this pitfall is described in Appendix VI.

Ultimately, data collected from the sources, though difficult to compare among themselves, were able to provide an idea of problematic injury areas. Not surprisingly, motor vehicle collisions, suicide, and falls topped the list.

III. *Areas for Improvement (Lessons Learned)*

One of the service goals of the RICRC is to monitor the injury problem in the County of Strathcona. The rationale behind this is that in order to support a community-based approach to injury reduction, it is necessary to know what injuries are occurring to whom and where. Injury data dissemination and analysis services should be provided to assist the community to identify specific injury problems. Improvement is required in increasing access to and use of Alberta's routinely collected injury data, work with more safety groups to widely disseminate injury data which are both user-friendly and timely, and enhancing the Centre's data analyses and information dissemination capability. A greater level of data services that are available to Centre customers through increased number of data related transactions and data products could act as the performance measure.

3.4.3 Community Collaboration

Collaboration is a mutually beneficial and well-defined relationship entered into by two or more organizations working together to achieve results they are more likely to achieve together than alone (Winer and Ray, 1994). These joint efforts -- collaborations -- demand relating to one another and working together in innovative ways. The beauty of collaboration is the acknowledgement that each organization has a separate and special function, a power that it brings to the joint effort. At the same time, each separate organization provides valuable services or products often critical to the health and well being of their community (Winer and Ray, 1994).

I. *Successes*

A. **Developing a Model for Community Collaboration/Community Involvement**

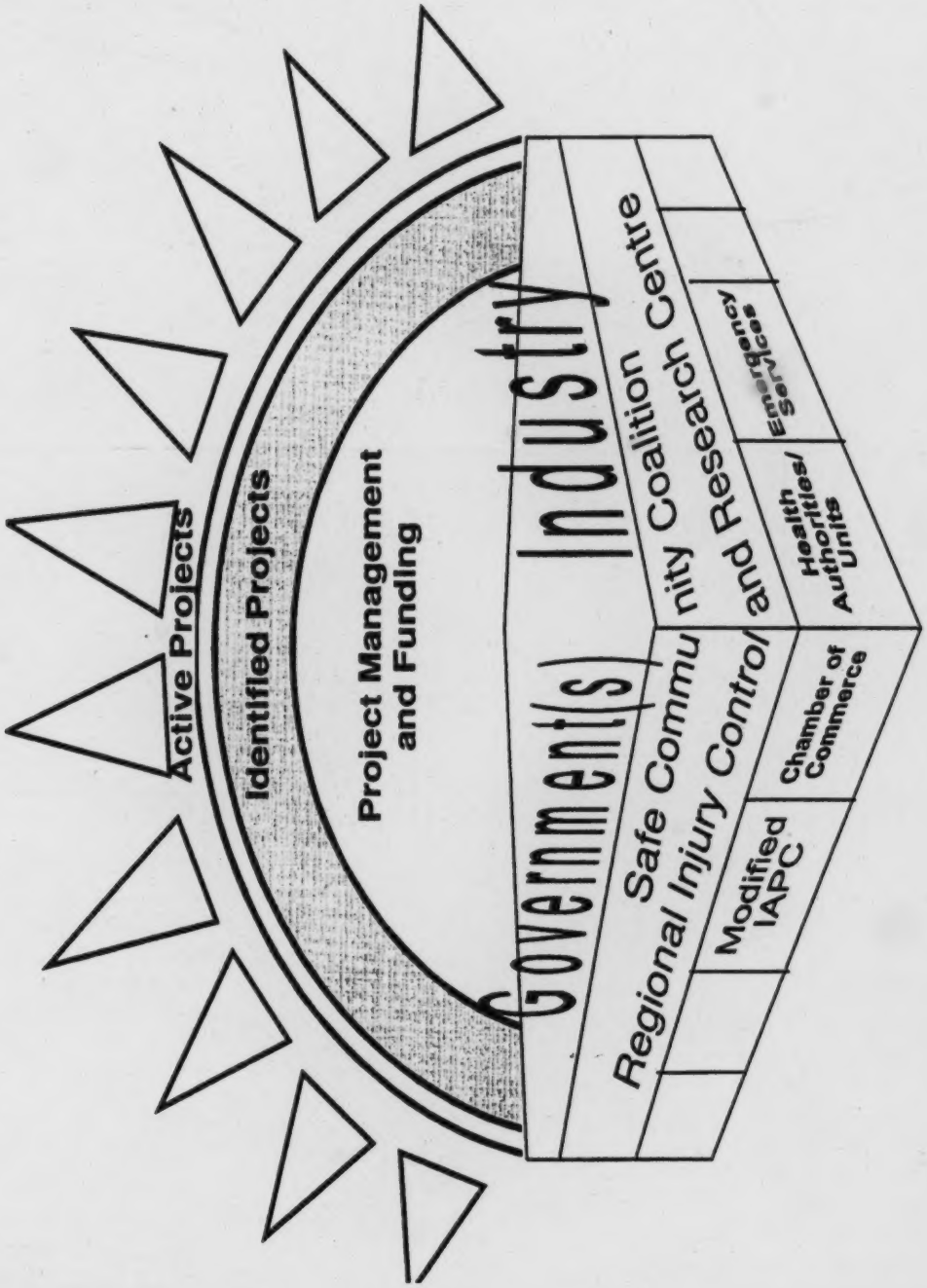
The process of designing and developing the Injury Control Initiative (ICI) Model, illustrated in Figure 3.3, and the member terms of reference for health and safety project management really began with the RICRC's and SCES's belief in reducing injuries through *"community participation"* and *"communication."* As respondents indicated,

> *"...I think the best model is one that is **community- based**..."*
>
> *"**Communication** with everybody involved, making it a broad project as possible, that it wasn't one person's project...."*

The ICI Model was also important in emphasizing the role of the RICRC in the community as a scientific body dedicated to injury control and research, rather than an enforcement or regulatory body.

Community participation required the identification of the ICI model's community collaborators. Collaborators identified came from a variety of fields including: employers, health care providers, community and civic groups, law enforcement, emergency medical and fire services, and local government. Appendix VII provides a description of each type of collaborator.

Figure 3.3- ICI Model



An important aspect in the process of model development was buy-in from these groups. At the onset of the model development, 22 local groups were included into the model automatically. With the aid of the ACICR and through a series of model development meetings, it was realized that these groups could not be included automatically because they were involved in health and safety in some way. Rather, formal "buy-in" was required. Groups themselves had to indicate that they were interested in being part of this collaborative effort. From the original 22 groups, 12 gave their support. The others indicated their support was contingent on the future of the RICRC and preliminary results of the collaborative effort.

In regards to community involvement, through the assistance and guidance of the SCES, the RICRC became a member of the CAER Committee. Through this membership, the Centre was involved in the planning of the "Partners in Injury Reduction" workshop. This workshop was designed to assist local businesses and industry on safety audits conducted, in addition to providing information on safer workplace environments. The Centre also acted as an information sharing resource in that the Centre performed an inquiry into the existence and performance of safety audits conducted on hand-held computers similar to those being used for the electronic patient care documentation.

The Centre was also involved on the ACICR's "Falls Project" Committee. The objective of the Committee was to establish a regional media campaign that would raise awareness of the burden associated with the leading cause of hospitalizations in Alberta- falls (Injury Prevention Center, 1994). Members on this Committee came from different segments of the community (e.g., government organizations and departments, community health centers, advertising companies, etc.). The RICRC's involvement, in regards to providing falls statistics, and contributing to committee discussions on project objectives and media advocacy, was truly a success in regards to the Centre being an active participant in a multi-sectoral endeavor. Such

involvement was observed to perpetuate further involvement in similar initiatives, thus contributing to the Centre's sustainability.

Other successes in regards to community involvement by the Centre were in the Child Car Seat Safety initiative at the SCES and the Safe Communities Bicycle Safety initiative. With the SCES, the Coordinator attended some of the child car safety seat checks and had the opportunity to talk with community residents about their views on injury and injury prevention efforts. In addition, the Coordinator, with volunteers from the Safe Communities Coalition of Strathcona County, went to County schools promoting the use of bicycle helmets by providing incentives to children *wearing* helmets in the form of restaurant coupons.

B. Community Safety Programs Awareness

When collected and analyzed accurately, data can tell a lot. However, such data cannot determine which injuries most concern people or compel them to act. Only a thorough understanding of the community will provide that. Too often, health programs are "dropped" into the middle of a community with little attempt to understand the political, sociocultural, and economic environment into which they must fit if they are to survive and to effect their goals (Dean, 1981). For that reason, data does not have to necessarily pertain to only injury statistics that are collected. Data can also include gaining an understanding of the injury picture through the collection of information on community health and safety programs. Therefore, it was important to find out what kinds of injury prevention projects have been tried before in the community, whether they have worked, and whether they are still in place (NCIPC, 1989). To that end, the Centre produced a document that profiled the various prevention efforts in the community. Since the RICRC is intended to strengthen and coordinate injury control initiatives, it was quite apparent that the Centre should be well informed of those groups in the community supporting injury prevention activities. The RICRC document, entitled "Community Injury

Prevention Programs for Strathcona County," was to be disseminated to all community injury control stakeholders, and served the purpose of informing community groups and organizations as to what other groups are doing in regards to injury prevention. Moreover, by providing such information, this document was intended to reduce duplication of activity, maximize on the collaboration of activities, and maximize on the utilization of scarce dollars allocated to injury prevention programs.

It is also important to learn about the community through the local newspaper by, for example, clipping stories that illustrate both the community's injury problem and the need for more information about it. The clippings of local County of Strathcona newspapers revealed that the community places much emphasis on motor vehicle collisions, bicycle injuries, and injuries to the elderly.

II. *Pitfalls*

A. Developing a Model for Community Collaboration

Learning to work together is a matter of compromise and maintaining respect for one another's disciplines. Clarifying discrepancies in the vocabulary of research and practice as they arise can move the focus from differences in perspectives to what each side has to offer. Such was the case initially with the Safe Communities Coalition Board of Strathcona County. The Board had clearly stated that the full extent of the RICRC was not communicated clearly to them. They did not understand the research nor the scientific (i.e., epidemiological) aspect of the RICRC. The following interview response indicated this *"lack of communication"*:

> *"**Communication** and I think a **level of understanding** by a lot of our community-based partners wasn't there because what they were thinking of getting into was more typically what they had dealt with..., a lot of people are older and they have been working in this field for some time and have some particular safety niche that they were already interested in, so really for them, stepping back and studying the whole disease etiology and epidemiology didn't really appeal to them..."*

B. Community Safety Programs Awareness

Pitfalls relating to the development of the document surrounded the collection of information from the various community groups and organizations. Though every effort was made to contact all participants (e-mail, telephone, fax, in-person contact), the Coordinator believed that the document was not as comprehensive as it should be. Possibly, with future increased awareness of the Centre and "word-of-mouth" in regards to the existing document, community participants not yet identified will come forward and provide information into their safety and prevention efforts.

III. *Areas for Improvement (Lessons Learned)*

In regards to a vision statement, during the process of designing the ICI model, a vision statement was not developed. A vision statement is beneficial in leading the group towards desired results generating energy and motivation. With a clear vision, the group will be better prepared to know what actions to take. Though the group knew what the model was intended to do, a vision statement would still have been beneficial.

Another area for improvement was realized through ICI model development in that only verbal commitment by those groups involved was obtained. The preferred manner in which commitment should have been obtained is by securing letters of commitment (Winer and Ray, 1994).

One important group not included in the model was the educators. Schools influence the attitudes and behaviors of children and young adults. Educators can, for example, encourage safe walking behaviors to and from school and encourage safety on school buses. For such reason, important initial acceptance from the educators should be pursued.

The RICRC needs to be able to increase "activity" whether it be in regards to media advocacy, data collection, or data dissemination so as to get injuries and injury control on the minds and agendas of policymakers on a *regular* basis. To that end, one respondent indicated the following:

> *"I think we need **on going financial commitment from the province**, and **commitment from the municipal council**, that there's a budget set and there's somebody in the **leadership role**... Governments are funny. They don't only need proof that there is a problem, they need to see that activity is happening."*

3.5 Discussion

This paper identified and described the Systems Approach phase of *Development* in the establishment of the RICRC. The methodology used (field notes and interview data) was effective in that it provided a descriptive summary of significant processes and events during this phase. Based on these descriptions, some further issues are raised pertaining to the development categories of Administration, Surveillance, and Community Collaboration.

Administration

The most important issue identified by study subjects was the sustainability of the RICRC. Centre sustainability refers to the RICRC being a long-term entity in the community. Having sustainability is important to the community because it ensures that there remains an organization that is accountable to the injury problem. Observational data indicated that advances in injury control would require adequate resources to accomplish tasks. From an administrative perspective, observational data supported the importance of housing the RICRC in the SCES. It was found that the fire station, being a County of Strathcona department and connected to all other services in the community such as computer network services (Information Services department), was able to provide all the necessary assistance in developing the Centre. For example, the SCES was able to provide the necessary office space in the fire station.

Furthermore, once the office was set up, the connection with the Information Services (IS) department permitted the Centre to utilize IS in the set up of the RICRC computer. IS was also utilized when computer problems and malfunctions were encountered. Telephone, fax, and photocopier services were also provided by the SCES. The fire station administrative staff also aided the RICRC in terms of accounting for Centre expenses and the planning of meetings. The observational data indicated that the fire station setting, the SCES staff, and the connections to the rest of the community departments aid in the Center's sustainability through the reductions in overhead costs.

Furthermore, observational and interview data also indicated that the RICRC's sustainability was also dependent on the utility of scientific services rendered in the community and on the diversification of funding. Having well defined projects for the community that are worthy of receiving funding ensures that the Centre is doing its job in the community and that its presence is acknowledged over the long-term. Much of the scientific services are based on the injury surveillance system. To that end, the implementation of the surveillance system is integral to the sustainability of the Centre. It is necessary to be perceived as a leader in injury control within the community. Having the community appreciate the implementation of a unique system will enable the Centre to be a sustainable entity in the community that is continually relied upon to provide important injury-related information.

Study subjects emphatically pointed out that money alone, however, is not enough to accomplish the community's goals of injury reduction. Another critical factor with regard to the sustainability of the RICRC that was identified in the interviews was the importance of knowledgeable and skilled leaders who understand the science of injury control, program planning, and evaluation. 86% (12/14) of respondents indicated that to be sustainable, the Centre should become a training ground for injury control specialists. Respondents indicated that

training in a "real-time" setting like the RICRC in the County of Strathcona also ensures that the Centre is a resource for potential injury control specialists. In addition, observational data explicated that individuals such as medical students (working as summer research assistants at the Centre) already have basic medical training and thus, were better able to understand the language of injury control. They were able to learn about the integrated nature of injury control components, community mobilization, and epidemiological surveillance. Moreover, having the trained professionals in injury control in a sustainable environment would effectively enable the monitoring of injury characteristics (i.e., epidemic episodes, seasonal variations, long-term trends, and demographic distributions) (NCIPC[2], 1989).

A valuable insight made during the interviews was the importance of EMS personnel and the Prevention Education branch of SCES in injury control. Several subjects stated that the RICRC should assist EMS personnel and members of the Prevention Education branch of SCES to become even more proactive in their fields. It was also identified that further training in injury control is required in order to become more proactive in their respective fields. They stated that " *... such training may not be so in depth so as to produce injury control specialists; less extensive training may be sufficient for participation in injury prevention activities".*

The results from the contact/encounter forms help to gauge the type of contact and encounters that can be expected for the following years of RICRC operation. Essentially, in terms of utility, such data collection tool also serves an important use for goal setting whereby the Centre Coordinator may wish to increase the Centre's level of contact with the community-at-large by, for example, 10%, 25%, or 35%.

This paper has discussed the issues pertaining to the RICRC Business Plan budget and funding. One question that deserves some attention is: Can an injury control and research center

similar to the RICRC be established and operated with a one year budget of less than $96,400? Resource allocation is obviously contingent on the nature of use. Depending on what the center developers determine as priority issues in their development, resources will be then used accordingly. However, it is important to note that the basic expenses of hiring a senior (a trained person in injury control or related field of epidemiology, medicine etc.) for the full-time Coordinator or Project Manager roles (approx. $55,000 in payroll) and office equipment (e.g., furniture, supplies, computers) (approx. $4,500), will, at minimum, cost approximately $60,000. These estimates do not obviously take into account other travel/conference (approx.$2,000) expenses or surveillance equipment rental (approx. $5,000 @ a rate of $330 per month per unit rented). Resource dollars for infrastructure are seldom allocated in the injury field. Thus, efficient use of funds and routine reporting of funds used to funding agencies is important, especially when applying for future funding to ensure sustainability. Ultimately, the RICRC much like the ACICR, if properly funded and mandated, can possibly make a difference, but in the end, one does not tackle a multibillion-dollar problem with limited resources and expect measurable outcomes (Francescutti, 1999).

Surveillance

While population-based surveillance is the preferred method of monitoring the occurrence of injury, many communities are unable to implement population-based injury surveillance systems (STIPDA, 1993). This may be for a variety reason including lack of resources and public health/epidemiologic surveillance expertise in designing and developing such comprehensive and integrative systems. The County of Strathcona, however, is in a unique position with the presence of the RICRC.

The potential for SCES EMS personnel and Prevention Education staff to serve as an important means of injury surveillance was emphasized by 93% (13/14) of subjects. For

example, both groups, with the appropriate training, can become "environmental observers" (Kinanne, 1997) who document observations from the scene. In particular, subjects indicated that in cases of child abuse or domestic violence, trained observational skills may place the EMS respondents and Prevention Education staff in a unique situation to provide counseling or suggest a referral (Kinanne, 1997).

The importance of EMS personnel in RICRC supported injury surveillance was emphasized by 71% (10/14) respondents. Several subjects stated that because the computerized surveillance system is EMS-based, this further substantiates the development of the RICRC in a fire station that delivers pre-hospital emergency medical services. It was pointed out that "*EMS personnel collect injury data at its source- the scene of an injury (the point at which an injury victim comes into contact with the medical system)- and input it into the computerized surveillance system. Their feedback into the design and implementation is crucial.*"

Community Collaboration

Observational data revealed many benefits to designing and developing the collaborative effort model for project management. Some of the benefits include: the ability to share information, expertise and networking between organizations, minimizing duplication of efforts and resources, enabling organizations and individuals to become involved -- without having sole responsibility, increasing credibility of members with the target audience and community at large, demonstrating collected commitment to injury reduction and increased ability for action, offering essential support and encouragement to particular groups in particularly difficult areas of injury control, and improving the integration of services. One of the major benefits of community collaboration and the ICI model is that no one group, whether it be SCES, RICRC, or Safe Communities, will carry the burden of being solely responsible for using their strained resources to tackle a problem that the entire community has a stake in solving. The most significant benefit

is coming closer to accomplishing each agency's overall mission by helping to create a safer and more efficient community for those who rely so heavily upon groups such as SCES for security and peace of mind. The public will see all collaborative groups as positive influences in their community. The full extent, however, of this collaborative effort will not be seen until future Systems Approach phases are performed.

Based on some observational data from field notes, one lesson learned in the design and development of the model, similar to the lesson learned in several of the CVD prevention projects (Bracht, Finnegan, Rissel, et al, 1994; Rissel, Finnegan, and Bracht, 1995), was that a relatively formal agreement on collaboration, reached very early in the genesis of the Centre and the model, promoted better program implementation and better program maintenance.

Respondents strongly stated that community involvement is crucial to the RICRC Centre and program success. They valued the time spent by the RICRC in building the relationships and communicating RICRC's role and functions to the community safety groups. It was also apparent that while the RICRC provides the scientific rigor to prevention programs, the safety groups could provide the necessary community volunteers to operationalize the program. Interview data also suggested that collaborative efforts allow groups to communicate and learn the inherent requirements of each group. For example, the housing of the Centre in the fire station provided the most appropriate setting in which to identify those elements deemed important by EMS.

Several respondents stated that the RICRC model could be the framework that would allow community groups, organizations, businesses and County council members to provide input into the design, development and implementation of community health and safety projects, thereby avoiding piecemeal approaches. They also emphasized that the RICRC is an integral component of the community and of the program planning process, especially in the area of

program evaluation.

A Phenomenological Perspective

There is "rhyme and reason" for the choices the Coordinator made. Moreover, in describing this "rhyme and reason," the Coordinator's perspective on injury control and research plays a significant role. This perspective gives justification to the motives that lead to the act of establishing the RICRC; and more specifically, in the context of the present study, it forms the basis of what were considered to be successes, failures, and areas of improvement (Werner, 1977; Schutz, 1970). Underlying the act is the everyday "common sense" decisions that are made which are based of the Coordinator's perspective on injury control. Furthermore, it is this "common sense" that indicated the need to concentrate development effort on the areas of administration, surveillance, and community collaboration.

Perspective is important because in the absence of a perspective on injuries, all injury phenomena would seem *equally* important for inclusion within Centre programs (i.e., motor vehicle collisions occur more frequently and can be more severe than lightening striking a human). Without a "map" of the social world provided by the outlook of RICRC partners and community injury control stakeholders, the RICRC Coordinator/researcher would deal randomly with questions and approaches (Kuhn, 1970; Werner, 1977). Processes or events done were inherently perspective guided. This justification of perspective is related to the choice of Administration, Surveillance, and Community Collaboration.

Processes and events that guide Centre development are justified by interpretive schemes referred to within phenomenological literature as "in-order-to" and "because-of" motives. These motives are descriptions of the Coordinator's intent within his ongoing activities or processes, and thereby define from the Coordinator's point of view the meaning of the act (activities,

processes, and events) for him. Together these two motives provide the reason for what is being done, and what has been done. To illustrate, the Coordinator sets up an injury surveillance database and is using an in-order-to motive for ascribing meaning to the surveillance activities. Success in being able to collect and analyze injury data from EMS is a process that has been established in-order-to fulfill a larger plan of reducing injuries in the County of Strathcona. The Coordinator's choice of activities and processes he deems relevant for realizing it have priority over other possible choices because-of the experience of others who have documented their successes and failures in the development phase. Overall, the meaning of any action in progress is to be found in the Coordinator's justification of his anticipated future state of affairs. This justification is defined both by the activities and processes (in-order-to) and by the past experience (because-of motive) which gave rise to that process or event.

Finally, phenomenologists assume that people experience the world not as a private one, but as an intersubjective world that is common to all people (Schutz, 1971). They wonder how people's experiences provided them with a stock of knowledge (i.e., on injuries) that is socially distributed and different among individuals. Thus, the phenomenological approach, in all its varieties, is concerned with the meaning or intention that social action (such as establishing the RICRC) has for those involved (the actors). The possibility of intersubjective understanding is assumed, and the major concepts of phenomenology-meaning, motive, intention, relevance and action- refer to basic structures of consciousness that underlie traditional research but that researchers usually do not address (Rothe, 1993). In the present study, intersubjectivity forms the underlying premise for the interpretation of events in such a way that the meanings related to development events and processes are shared and verified on an ongoing basis with participants.

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CHAPTER FOUR

Conclusions and Future Directions

Public health aims to make the world a safer place in which to live. Moreover, if public health is about promoting health and preventing risks to health, then injury prevention, based on morbidity and mortality statistics, would seem to call out as the number one priority of public health practice. Logic and common sense would dictate such a priority, such a perspective, such a focus...*unless* for some reason injuries were not preventable and not susceptible to the standard tools of public health (Christoffel and Gallagher, 1999).

4.1 Conclusions

Increasingly, injury control is recognized as an important area of public health. However, it still lags behind other important areas (i.e., cancer, cardiovascular disease, AIDS) in terms of the availability of experienced, trained injury control professionals. There is an acute need for organizational templates and credentialed staff who can address injury control at the community level. Through the use of the Systems Approach, a community-based model for injury control was established in a fire station. This model center, the RICRC, acts as an organizational template for other communities who are interested in improving safety levels, reducing injury risk and preventing the tragic losses associated with injuries.

The RICRC acts as a community-based infrastructure model tailored to the requirements of the injury control system. The study also established the Centre as a logical extension of EMS by highlighting the injury control link between the two. Ultimately, the present study was able to

identify that injuries are a problem in the County of Strathcona; that dedicated infrastructure designed in a fire station situated in a progressive community like the County of Strathcona is needed to bring about long-lasting change; and that developing such an infrastructure is not an overnight process as many activities go into its establishment.

The RICRC is indeed a "catalyst" as termed by interview respondents. It is a center for change. Change in moving the science of injury beyond just prevention to now include the all-encompassing and integrated system of injury control. Without the unifying nature of the RICRC, there remains an unstructured, uncoordinated, unfocused approach to injury control that is handled on a part-time basis with no research elements incorporated in the County of Strathcona. Therefore, the challenge confronting us today is to enhance the impact and effectiveness of the injury control field by establishing a community injury control and research center. Working along side EMS personnel is but just one piece of the puzzle. A broad matrix of collaboration with other community agencies and groups who are stakeholders in injury control, injury surveillance, collection, analysis, and dissemination of injury data, and evaluation of injury prevention programs are also pieces of the puzzle that are required. Even in the United States, the Centers for Disease Control and Prevention and the National Committee for Injury Prevention and Control have identified five areas that, if successfully addressed, could optimize proven strategies for prevention: (1) strengthening the public health infrastructure; (2) building and encouraging collaboration and coalitions of state and local safety agencies and organizations; (3) improving training and technical assistance; (4) better translating of research findings into practice; and (5) increasing public awareness and advocacy (NCIPC[2], 1989). Performing all these tasks "under one roof", or in the hospices of an injury control and research center is essential so that an injury control and research center can ultimately, coordinate, monitor, and evaluate community-based injury control activities.

This thesis initiated discussion on the establishment of a sustainable community fire station-based injury control and research center. This study met its objectives in terms of: designing a conceptual framework that was based on a proven method (Systems Approach); addressing the problem of injuries at the community level, the need to solve the problem by establishing a dedicated infrastructure to injury control, and determining goals for such a solution all in the *Analysis* phase; defining the *Design* phase by describing the location and unique setting of the Centre in the County of Strathcona and the fire station, respectively, and outlining the appearance and functions of the Centre; and finally, describing some of the significant processes and events that occurred in the *Development* phase.

This study concluded that the establishment of such an infrastructure (the RICRC) was a multi-phase process. In particular, the *Development* phase did ***not*** entail a singular process. It was composed of a framework that maintains that various integral areas of development are addressed- Administration, Surveillance, and Community Collaboration as was the case in the present study. These avenues of development may differ from center to center, but no one avenue is so important that it is the sole area of concentration in this phase. Ultimately, injury control requires a multi-faceted, multi-sectoral approach.

In establishing the RICRC at the community level, it can be concluded that community-based interventions (Injury Prevention Centre, 1994):

- Provide a forum to bring people who have a common interest in reducing injuries.
- Encourage the prioritization of issues by the community at the local level.
- Create a mechanism for community residents to exercise their right to contribute at the community level.

Such a holistic approach is needed to move away from the reactive system that currently focuses on the treatment and problem-based service delivery, and towards a proactive system within which the culture values health, safety and well being.

4.2 Future Directions

The Centre will next proceed into the *Implementation* phase of its establishment process using the Systems Approach. In this phase, it is expected that greater community mobilization and greater Centre outputs will be observed. This phase will find the use of the Systems Approach a versatile approach to be utilized in the establishment of prevention programs. The *Evaluation* phase will require those involved in the Centre's establishment to perform various evaluation studies (i.e., process, outcome evaluations) to measure the Centre's level of performance and effectiveness in the community.

The RICRC, being a community intervention and/or program, is on its way to becoming institutionalized. A program is *institutionalized* when it has achieved ongoing financial support and commitment from the community in which it is based (NCIPC, 1989). Institutionalization is crucial; without comprehensive, long-term responses to the injury problem, programs will never significantly reduce injury death and disability and their associated costs. The NCIPC[2] (1989) clearly stated that "programs that are in operation for only a year or two and then disappear (usually because of a loss of funding) are unlikely to bring about real change." The RICRC is on track to becoming institutionalized based on the following elements helpful in achieving institutionalization as stated by the NCIPC[2]:

- A designated lead agency with an injury control coordinator;
- Accurate and timely injury mortality and morbidity data from the community;
- Clearly defined program goals, objectives, and interventions;

- Evidence that the program does or will be able to reduce injury rates or injury risk;
- Media and public relations efforts to increase community awareness of injuries and the need for action;
- A coalition of committed people working together to coordinate their injury prevention efforts.

Future studies will also have to address the potential cost implications regarding the presence of a community-based injury control and research center. Such centers would create an attitude in which communities begin to acknowledge accountability and responsibility for their own injury problems in order to reduce the number and severity of injury morbidity and mortality. Moreover, a reduction in these rates should precipitate a reduction in healthcare costs associated with injuries. Thus, cost effectiveness studies pertaining to these centers must be performed.

Overall, the Centre's presence should bring about a greater awareness of injuries in the community so that County of Strathcona residents do not see them as just "accidents" that are random and uncontrollable events beyond human control. It should also put injuries on to the agenda of local business, other safety groups, the media and politicians on a regular basis. This will be attained with the greater dissemination of surveillance data. The RICRC will provide leadership harnessed by strong collaboration, supported by a sophisticated injury surveillance system, and kept alive by research and evaluation programs. By investing in the RICRC, Strathcona County residents will no longer be able to call the injury epidemic 'silent'. People will begin to see the risks in their lives. If not to completely avoid them, residents will begin to understand how to take "smart risks", ultimately saving both money and lives.

4.3 References

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Appendix

Appendix I

RICRC Establishment Overview

As of May 1998, the County of Strathcona became the pilot site of the first community-based injury control and research center, the RICRC, to support the injury control efforts of the ACICR. Specifically, because the RICRC is a community level center, it acts as a satellite center to the ACICR. The ultimate goal for the future is to have many such community level centers relaying community information on injury trends, prevention efforts, and other injury control initiatives to the central provincial center. Such an effort would help maintain a strengthened and coordinated approach to injury control in the Province of Alberta (mandate given by Alberta Health to the ACICR).

The establishment of the RICRC in the County of Strathcona is to occur in a stage by stage approach, much like the one utilized in the development of the Dynamic Injury Data Program (Strome, 1998). The three specific stages in the establishment of the RICRC would incorporate the utilization of the Systems Approach. The three stages are:

STAGE I: Analysis of the problem/situation regarding the need or rather the lack of a center that solely examines injuries. Design and Development of this injury control and research center in the unique physical environment of a community fire station.

STAGE II: Implementation of RICRC activities in order to meet program outputs. Program outputs include: research and surveillance, community needs assessment, public education, local medical community involvement, engineering and enforcement recommendations, and regional partnerships. Consequently, implementation would include the actual RICRC coordinated effort in injury prevention/health and safety project management.

STAGE III: Evaluation of the RICRC in regards to design, development and implementation phases.

Ideally, if the resources (i.e., funding, staffing/researchers, and equipment) were available, these stages could be done sequentially (all within the present project). However, resources are not as such, or at least the appropriation of funding for injury control and research is not substantial enough to warrant such work to be done simultaneously. Hence, the RICRC's establishment must progress in stages. STAGE I was addressed by the present study.

Appendix II

The Burden of Injury

General Definitions

An internationally accepted and long standing definition of injury is any specific and identifiable bodily impairment or damage caused by acute exchanges with environmental energy that are beyond the body's resilience (Haddon, 1980). The energy may be mechanical, thermal, electrical, ionizing radiation or chemical. Under this definition, all such cases are included regardless of intent or mechanism. An example of these impairments would be a burn, a car collision, electrocution, or being poisoned or asphyxiated. Interestingly, the word injury comes from the Latin word "*injuria*"; *in* meaning "not" and *juria* meaning "right". Therefore, one need only think of the losses associated with injury which encompass personal, financial and societal losses to know that injury is <u>not right</u>.

Knowing that injuries are "not right", much of society fails to view them as predictable and preventable. The term "accident," with its connotations of inevitability and lack of apparent cause, is still widely referred to in regards to many injuries and often obstructs the study of injury prevention (Loimer et al, 1996). Injuries seen as "just accidents" are often equated with the biblical connotation, an "act of God," in that "accidents" are beyond one's control and therefore, cannot be prevented nor predicted. The public usually associates the word with an event, not with the damage that results. For example, many people understand *accident* to mean a car crash, rather than the transfer of energy associated with the crash. This distinction is important to the science of injury prevention because air bags or design features in automobiles can prevent the transfer of energy which causes injury, even if the "accident" (e.g. car collision) occurs (Loimer et al, 1996). Current terminology needs to move away from the distorting and damaging image that is associated with the term "accident". Ultimately, this distinction in terms (i.e. between "injury" and "accident") acknowledges recent advances in understanding injuries and how they can be prevented.

The true enormity of the injury problem can be realized by expressing the losses due to injury in terms of potential years of life lost (PYLL). PYLL is defined as the number of years that an individual lost because they died prematurely (i.e. before their normal life expectancy) (National Committee for Injury Prevention and Control, 1989). The formula is calculated by subtracting the age of death from the normal life expectancy. Common practice is to use age 75 years as the age for normal life expectancy. In order to calculate PYLL for the injury deaths that have occurred in a community, the PYLL formula is used for each death. Once the individual calculations have been made, the final number for PYLL is obtained by adding together all the individual numbers. Premature deaths are associated with pain and loss on micro and macro levels. Injuries are the leading cause of death in those under age 44 and result in a tremendous loss of human potential. PYLL, mortality and morbidity data, can be used to characterize the magnitude of the injury problem. This valuable information, combined with personal testimonials about loss due to injury, can be powerful ways to increase awareness of the extent of the injury problem in their community.

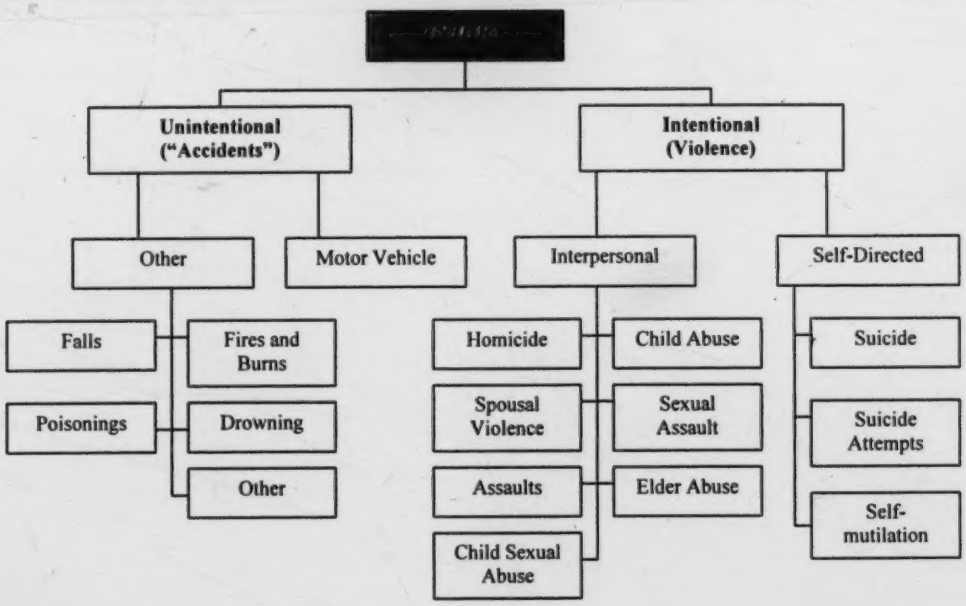
Case Definitions

Injuries are classified as intentional and unintentional. Figure A2.1 is a simplified schematic of injury classification. Intentional injuries are deliberate injuries, such as inter-personal violence (family violence, suicide, and homicide) and self-inflicted injury (suicide, self-

mutilation). Unintentional injuries are injuries that occur without intent to do bodily harm. For example, injuries from motor vehicle collisions, falls, drowning, poisoning, burns, sports and recreation, and work-related incidents. Unintentional injuries make up a large portion of the overall injury statistics, and are a big concern for injury control practitioners in the Province of Alberta. Alberta has one of the highest rates for unintentional injuries among the provinces in Canada (Injury Prevention Centre, 1996)

The word "injury" can have several meanings, depending on whether it is being used in clinical, research, or epidemiological settings. For instance, an injury could be defined as the *outcome* of an adverse event (e.g. broken leg, crushed chest). Alternatively, an injury could be the *event* leading to an adverse event, such as a fall or a motorcycle crash. Moreover, this definition can be further narrowed according to specific research or public health objectives (Graitcer, 1992). For instance, injuries can be defined on the basis of the level of medical care given (e.g. hospitalization, emergency room visits, or physician's office visits), the injury outcome (e.g. complete recovery, permanent or temporary paralysis, death), the place where it occurred (e.g. daycare center, home), the type of activity that occurred (e.g. sports and leisure, occupational), or the event itself (e.g. a fall from a ladder, a fall down stairs, or a fall from a motorcycle). Furthermore, risk factors (such as alcohol or drug use), the use of prevention devices (e.g. sear belts, smoke detectors), and intentionality (e.g. homicide, assault) are used to qualify an injury case definition (Graitcer, 1992).

Figure A2.1- Injury Classification



Adapted from Baker et al, 1992

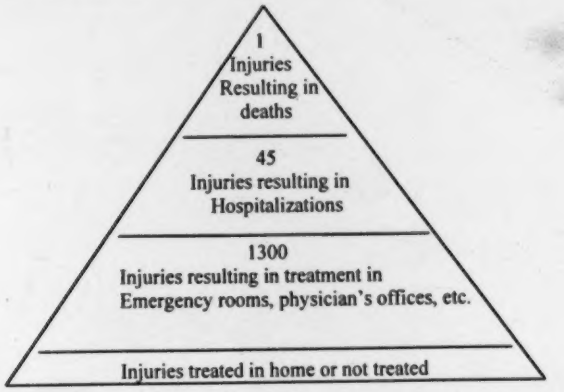
Injury Statistics

Injury is one of the most under-recognized public health issues facing the world. Three and a half million people worldwide die every year as the result of injuries, more than two million in low-income countries (World Health Organization, 1993). It is further estimated that 78 million people worldwide are disabled every year because of injuries (Friedman, 1985). In Canada and the United States, injury is the leading cause of death for people under the age of 44 and causes more potential years of life lost (PYLL) than any other disease process (Baker et al, 1992). In North America, more children over the age of one die from injuries than from cancer, heart disease, respiratory disorders, diabetes, and Acquired Immune Deficiency Syndrome (AIDS) combined (Avard et al, 1989). In Alberta, there were 1,414 deaths and over 35,000 hospitalizations as a result of injury incidents in 1997 resulting in 50,140 potential years of life lost (ACICR, 1998).

The toll of injuries is staggering not only in terms of mortality and morbidity but also in terms of monetary cost. In Alberta, the average annual direct and indirect costs of automobile collisions alone is $3.55 billion (including both direct and indirect costs) (Alberta Motor Association, 1996). In Canada, the annual burden of injury is $14.3 billion, compared to $13.1 billion for cancer (Moore et al, 1997). Less than one cent is spent on injury research for every dollar spent on injury treatment; yet nine cents is spent on cancer research for every dollar spent treating cancer (Elliot et al, 1996). Moreover, the focus given to the injury issue is on the treatment of injuries and not their prevention. "Treatment of injuries is simply proof of [society's] failure to *prevent* them. [Society's] inability to prevent them means that more trauma centers are needed, more intensive care units, and more rehabilitation services. Prevention of injuries should mean that fewer of these services are needed" (Francescutti, 1991).

A study done in Massachusetts in 1980-81 examined injuries among children. It found that for every child under the age of 19 who died as a result of injuries, there were another 45 children hospitalized for treatment and 1300 children treated in emergency rooms (Gallagher et al, 1982). It was also estimated that twice this number were seen in physicians' office or treated at home. These numbers are often represented in what is called the Injury Pyramid, Figure A2.2. When researchers talk about the size of the injury problem, they indicate that those injuries that come to their attention are only the "tip of the iceberg." This is a result of only collecting data on those injuries that are the most severe. Specifically, mortality and hospitalization data reveal only the tip of the iceberg regarding the problem of injuries. It is important to look beneath the surface to find data that includes injuries seen in hospital emergency departments, physician offices, walk-in clinics, and injuries not treated in the formal health care system. In other words, researchers can merely guess at the less severe injuries that never get recorded as public statistics and are thus represented by the portion of the iceberg which is "underwater" (Injury Prevention Centre, 1995).

Figure A2.2- Injury Pyramid



Source: Gallagher et al, 1982

Summary

In view of these burdens, the benefits derived from reducing injuries are great indeed. Benefits include reductions in costs of emergency department visits, hospitalizations, rehabilitation, home care, public assistance, productivity losses, and pain and suffering among injured persons and their loved ones (US Department of Health and Human Services, 1991).

Injury Control

Components of Injury Control

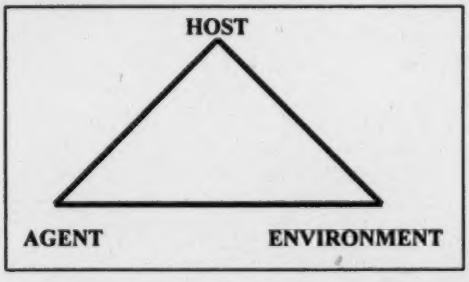
An effective injury control system combines injury prevention with emergency medical services, acute care and rehabilitation (Francescutti, 1997). Injury prevention is usually divided into three distinct prevention categories: primary, secondary and tertiary prevention. The essence of injury prevention, primary prevention, is to keep an injurious agent from reaching a susceptible host in levels that exceed human thresholds. In other words, even when the event itself cannot be prevented (e.g., motor vehicle collision), the injuries (e.g., head, body or extremities) can often be prevented (e.g., by seatbelts, or airbags). Prevention is accomplished by identifying the causes of injury and those at risk for different types of injury; developing (as is the case in the present study) and implementing effective interventions (e.g. legislation, engineering, education etc.); and monitoring and evaluating the effectiveness of the interventions on the population at risk. Over the long term, prevention approaches are more cost-effective than treatment. In terms of secondary prevention, when a person is injured, it is important to have adequately trained and equipped emergency medical personnel and emergency-medicine physicians in place to limit further consequences of the injury (Francescutti, 1997). In tertiary prevention, it is important to bring the injured/disabled person as close to the pre-injury state so as to return them to the home and work environment. Finally, the entire injury control system is guided by one last component-vision/leadership. Passionate and highly motivated persons with the vision and leadership to guide and maintain the injury control system are essential to the system's overall success.

When injury prevention programs have been initiated, there has been enormous pressure to demonstrate a reduction in actual injury rates in a short time period and to implement prevention measures limited to "hot topics" such as violence or bicycle helmets and which are only targeted to the immediate problem. In other words, the message is often: "Do something fast and give the impression that the problem is being addressed or taken care of." Expectations tend to be unrealistically high and many of the factors contributing to the injury problem are often ignored. Thus, addressing the injury problem in this way is very problematic. From an epidemiological perspective, injuries differ from other diseases in that they usually do not have a pre-clinical stage and thus, they have an extremely short incubation period as compared with other diseases such as cancer or cardiovascular disease. The time, or incubation period, it takes for a bullet to exit a .357 Magnum handgun and enter the human body causing severe injury is milliseconds. However, the progression of cancer in the human body can be calculated in months and years. The emphasis here is that with diseases that have long incubation period such as cancer, interventions that demonstrate effect can be observed. However, with injuries, because the incubation period is so short, interventions that demonstrate effect are difficult and even impossible to observe (however, some exceptions such as air bags exist). There is no time to form the close relationships and support groups that other slower evolving diseases provide (Francescutti, 1999). Consequently, constant or sustained, as opposed to short or periodic, attention to injuries and interventions is required in order to measure and evaluate the effectiveness of various injury control initiatives.

Epidemiologic Triangle

Many injury epidemiologists conduct their investigations mindful of a theoretical model developed by infectious disease epidemiologists (Robertson, 1992). Figure A2.3 depicts the epidemiologic triangle made up of the host, agent, and environment. As applied to injuries, the ***host*** is the person or people to whom an injury happens. The characteristics of the host include the person's age, physical health, level of safety knowledge and habits. All of these can affect the likelihood and severity of injury. The ***agent*** is the object that transfers energy and causes the injury. The ***environment*** includes all the physical, social, and economic factors that surround the injury event. To see how these items work together, consider the potential risk for a burn injury to an unemployed person at home in winter (Injury Prevention Centre, 1995). The person lives in a log cabin (physical environment) that is made of highly flammable material. The cost of heating (economic environment) may influence how this person chooses to heat the home. If a kerosene heater was used, its careless use (host and agent factors) could lead to flames. Therefore, as can be seen, physical, social and environmental factors, and the way people use products can increase the risk for injury. Consequently, a tool that is commonly used to look at these factors over time is Haddon's Matrix.

Figure A2.3- Epidemiologic Triangle



Source: Robertson, 1992

Haddon's Matrix and Countermeasures

Injuries result as a culmination of a set of circumstances and pre-existing conditions which may best be understood as a chain of events (Ozanne-Smith and Vulcan, 1990). Interventions can be implemented to break the link in the chain of events leading to injury. William Haddon, an engineer, a physician, and an epidemiologist had an interest in looking at injury events in an orderly and organized fashion. He looked specifically at the interaction between the host, agent and environment of the injury triangle over time. Haddon developed a "phase-factor matrix" which provides a conceptual framework that schematically represents this chain of events. More specifically, if different factors and times in the evolution of an injury are isolated, a grid results that allows for a systematic exploration of each part of an injury event. It also exposes opportunities where research, engineering, education and treatment can play larger and cooperative roles.

The matrix itself consists of temporal notions or pre-event, event, post-event phases plotted against human, vehicle (product) and environmental factors (Robertson, 1983). The temporal phases are generally equated with primary (pre-event), secondary (event), and tertiary prevention (post-event) (Ozanne-Smith and Williams, 1995). The ***pre-event*** phase is the period during which the interplay of factors determines whether an injury-producing event will take place. Interventions applied in this phase (primary prevention) prevent or avoid exposure to destructive or injurious energy. The ***event*** phase is the time period at the moment of crisis that included all factors that influence the degree of injury that results from the incident. Interventions effective in this phase (secondary prevention), need to have been in place prior to the event occurring in order to provide an appropriate environment in which exposure can be managed or minimized. The ***post-event*** phase is the time period after the injury has happened and includes everything that determines whether the severity of the injury's consequences can be reduced. Interventions in this phase (tertiary prevention measures), provide conditions in which further injury can be avoided and treatment can be started so as to bring the injured person back to his/her pre-injured state. An example of the utility of Haddon's Matrix is illustrated using a car crash in Figure A2.4.

This matrix is particularly useful in determining appropriate points for intervention to prevent or ameliorate injuries. The point of intervention is not necessarily early in the chain of events: it should be where the intervention is possible or ideally where it will be most effective. Furthermore, in order to undertake interventions for injury prevention, appropriate countermeasures need to be developed and implemented. Countermeasures need to be appropriate and thus specifically applicable to a particular injury problem. Haddon also developed ten basic strategies for injury prevention, which provide an extremely useful checklist for determining options for countermeasures. These countermeasures are listed in Table A2.1.

Figure A2.4- Haddon's Matrix Applied to Car Crash

Phase \ Factor	Host	Vehicle	Environment
Pre-event	• Driver education • Alcohol and drug abuse • Fatigue • Impaired vision/hearing	• Antilock brakes • Motor vehicle inspection	• Divided highways • Pedestrian overpasses • Speed limits
Event	• Age • Osteoporosis	• Tempered glass • Safety belts • Airbags	• Breakaway poles • Impact-absorbing barriers
Post-event	• First-aid training	• Flame-retardant fabric • Puncture-resistant gas tanks	• 911 emergency number • Trauma care systems • Regional rehabilitation centers

Source: Haddon, 1980; Tintinalli, 1996.

Table A2.1- Injury Countermeasures

Countermeasure	Example
1. Prevent the creation of the hazard.	Ban production and sale of assault weapons to civilians.
2. Reduce the amount of hazard.	Limit water heater temperature to 47.25°C (125°F).
3. Prevent the release of a hazard that already exists.	Put dangerous medications in "child proof" containers.
4. Modify the rate of distribution of the release of the hazard from its source.	Require fire-safe cigarettes that cannot easily ignite furniture or bedding.
5. Separate, by time or space, the hazard from that which is to be protected.	Construct overpasses or underpasses to eliminate crossing streams of traffic.
6. Physically separate, by barriers, the hazard from that which is to be protected.	Equip cabs with bullet- and knife-proof partitions.
7. Modify surfaces and basic structures to minimize injury.	Equip all new cars with driver- and passenger-side air bags.
8. Make that which is to be protected more resistant to damage.	Issue bulletproof vests to law enforcement officers and security guards.
9. Begin to counter damage already done.	Promote citizen training in first aid and CPR.
10. Stabilize, repair, and rehabilitate the injured person.	Implement trauma care systems throughout the nation.

Source: Haddon, 1980; Tintinalli, 1996.

Injury Surveillance

Injury data that is comprehensive, accurate, timely, and readily accessible is necessary to plan, implement, evaluate, and sustain the injury control process.

Epidemiologic surveillance can be defined in two ways. Langmuir (1963) defines it as "the systematic collection, analysis, interpretation, and sharing of health data for the design,

implementation, and evaluation of public health programs." Teutsch et al (1994) also define epidemiologic (or public health) surveillance as the "systematic and ongoing assessment of the health of a community." The purpose of surveillance is to disseminate information in a timely manner about the incidence and severity of injuries in a population; to identify new problems early, so that adequate interventions can be possible; to determine priorities for action, both in terms of injury problems and high-risk groups; and to help evaluate preventative measures (Berger and Mohan, 1996; Strome, 1998).

According to Berger and Mohan (1996), reliable data on injuries are necessary to:

- Assess the nature and extent of injuries in a population,
- Identify groups that are most at risk for specific injuries,
- Establish priorities for intervention,
- Allocate appropriate resources for injury control programs,
- Design countermeasures,
- Evaluate the effectiveness of laws, technological changes, environmental modifications, and educational campaigns in reducing injuries, and
- Convince the public and policymakers of the importance of certain injuries and the need for appropriate action.

Limitations of Current Injury Surveillance

Establishment and maintenance of meaningful surveillance systems, those that contain accurate, comprehensive data, require enormous investments of time, money, and personnel (Berger and Mohan, 1996). Currently, there is no unified, structured, and comprehensive injury surveillance system providing accurate, timely, and easily accessible data relating to the occurrence and cost of injury in the province of Alberta. The lack of such injury data severely limits the scope, quality, and quantity of injury research that can be undertaken (Strome, 1998).

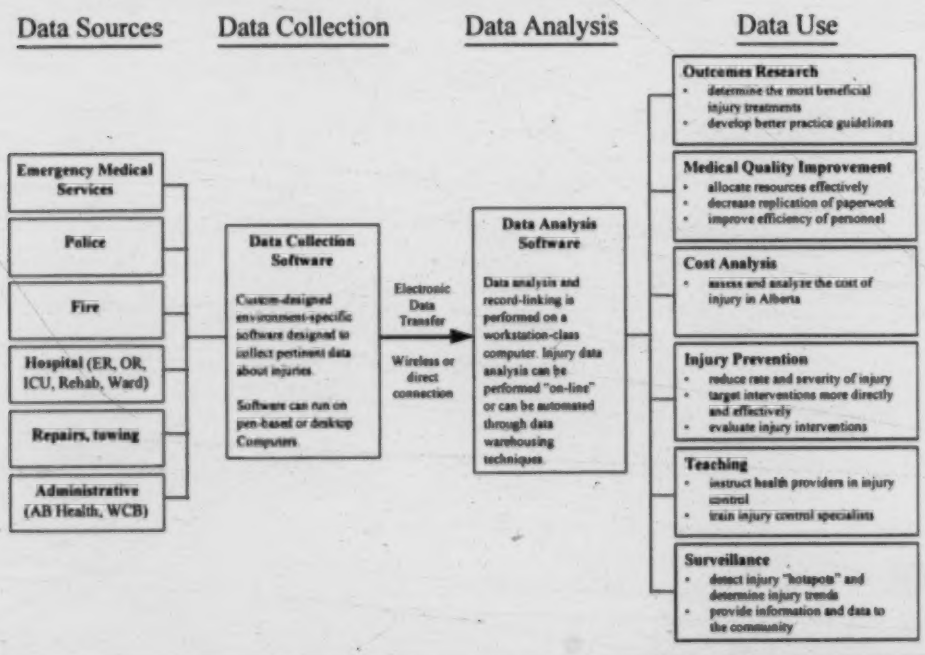
In Alberta, injury data can be collected and obtained from *de facto* sources for injury data. These sources include provincial government vital statistics, trauma registries and administrative databases. Specific data pertaining to injury mortality and morbidity can be abstracted from the vital statistics databases and the hospital separation database. Though injury data can be collected via such sources, there is still the problem of an unknown numbers of injuries being unreported (Francescutti, 1991). In addition, at times, several different organizations can record information about the same injury. Because the different recording systems, whether they be police, hospital, insurance etc., are not linked, very different injury statistics can be reported for the same type of injury (Berger and Mohan, 1996). The lack of an integrated, comprehensive injury surveillance system is still an issue in Alberta.

Dynamic Injury Data Program

To address the long-standing problems of accuracy, timeliness, and availability of injury data in the province of Alberta, the Dynamic Injury Data Program (DIDP) (Strome, 1998) was initiated to develop, implement, and evaluate a computer-based injury surveillance system. The goal of the program is to provide timely and readily available injury data to the community to aid in developing injury control strategies. The objectives of DIDP are to contribute to the prevention and better management of injuries, to improve our understanding of the impact of injuries on our health care system, to seek trends in injury patterns so as to stimulate epidemiological research of injuries, and to identify risk factors associated with injuries.

Recently, an injury surveillance module has been developed for emergency medical services (EMS) (Strome, 1998). Modules for hospitals (emergency department (ER), operating room (OR), intensive care unit (ICU), wards, and rehabilitation services), police, fire, and administrative sources such as the Workers' Compensation Board are also currently under development. Figure A2.5 is an overview of the Dynamic Injury Data Program. Essentially, the DIDP will permit epidemiologists and other injury control researchers to capture and link injury-related data from a multitude of sources to build a comprehensive picture of how injury outcomes relate to severity, treatment, and rehabilitation. Injury data are to be regularly uploaded to a central data repository, or "server", on which the data are analyzed to determine demographic and etiologic factors and to detect temporal and spatial (i.e., geographic) trends in injury occurrence. Data will be used for outcomes research, medical quality improvement, cost analysis, injury prevention, teaching, and injury surveillance. Analyzed data will be readily available to the community via on-line services such as the Internet, or in more traditional formats such as printed reports (Strome, 1998).

Figure A2.5- Overview of the Dynamic Injury Data Program


Data Sources
Data Collection
Data Analysis
Data Use
Emergency Medical Services
Police
Fire
Hospital (ER, OR, ICU, Rehab, Ward)
Repairs, towing
Administrative (AB Health, WCB)
Data Collection Software
Custom-designed environment-specific software designed to collect pertinent data about injuries.
Software can run on pen-based or desktop Computers.
Electronic Data Transfer
Wireless or direct connection
Data Analysis Software
Data analysis and record-linking is performed on a workstation-class computer. Injury data analysis can be performed "on-line" or can be automated through data warehousing techniques.
Outcomes Research
• determine the most beneficial injury treatments
• develop better practice guidelines
Medical Quality Improvement
• allocate resources effectively
• decrease replication of paperwork
• improve efficiency of personnel
Cost Analysis
• assess and analyze the cost of injury in Alberta
Injury Prevention
• reduce rate and severity of injury
• target interventions more directly and effectively
• evaluate injury interventions
Teaching
• instruct health providers in injury control
• train injury control specialists
Surveillance
• detect injury "hotspots" and determine injury trends
• provide information and data to the community

Adapted from Strome, 1998

Ultimately, the development and utilization of the latest computer technology is valuable only if the data that is collected through such state-of-the-art systems is put to use in the prevention and control of injuries.

Appendix III

Regional and Provincial Injury Trends

According to the Chair of the Advisory Body for the Alberta Centre for Injury Control and Research (ACICR), the Province of Alberta is one of the "most dangerous provinces in which to live" in regards to injuries. Data collected from the ACICR can substantiate this claim. Among only the Canadian provinces, Alberta's rate of inpatient injury hospitalizations per 10,000 population ranks second behind only Saskatchewan (ACICR, 1998). The rate of injury-related hospitalizations in Alberta in 1995-96 was 93.6/10,000. That was much higher than the nations lowest rate (57.7/10,000) and was higher then the national average (72.2/10,000) (ACICR, 1998; Canadian Institute for Health Information, 1998). In 1997, injury was the leading cause of death in Alberta for people aged 0-44 as it was responsible for nearly 50% of all deaths in that age range (ACICR, 1998; Alberta Municipal Affairs, 1997). In 1997, everyday in Alberta, three Albertans prematurely lost their lives due to injuries (Alberta Municipal Affairs, 1997). Specifically, in 1997, there were 1414 injury-related deaths in Alberta claiming the lives of 1347 Albertans. Approximately one third of these were due to intentional injury, including homicide and suicide (Alberta Municipal Affairs, 1997). Falls were the leading cause of injury hospitalizations for both males and females (Injury Prevention Centre, 1996). Suicides, followed by motor vehicle collisions, were the leading causes of injury death among Albertans living in Alberta (Alberta Municipal Affairs, 1995-97). To address this provincial problem, the ACICR was established.

Injury statistics collected at the health authority level, specifically the Capital Health Region that includes the County of Strathcona, were gathered and analyzed. According to Table A3.1, injury (including suicide) ranked third, after heart disease and cancer, in regards to leading causes of death in the Region. In Table A3.2, injury ranked first in regards to PYLL as injury accounts for the largest percentage of PYLL due to the early age at which most injury deaths occur. If such statistics are observed from the perspective that injuries, among all the other diseases presented as leading causes of death, are seen as predictable and preventable, then the injury death rates, numbers and PYLL are seriously high and therefore, problematic. Moreover, suicide/self-inflicted, unintentional poisoning, motor vehicle-related, homicide/assault, and falls-related injuries were the top five causes of injury death among Capital Health Region residents. In fact, suicide/self-inflicted, unintentional poisoning, and homicide/assault were the injury categories having higher than the provincial rate/10,000 (ACICR, 1998). In addition, according to 1996-97 statistics, there appeared to be a general trend in which males out numbered females in injury-related ER visits, hospitalizations, and deaths across various age groups. For males and females aged 5-14, injury is clearly the number one reason for ER visits (91.3 per 1,000 population for males and 88.2 for females) (Capital Health , 1997). Injury is by far the most common reason for emergency room (ER) visits for males and females aged 15-64. For instance, in 1996-97, 29.4% of ER visits for men and 21.1% visits for women were because of injury. For both males and females, injury ranked number one with the ER visit rate being 97.1 per 1,000 males and 67.5 per 1,000 females. While injury remains the number one reason for ER visits for both sexes, young men aged 15-24 had almost double the visit rate as young women in the same age category (168.6 per 1,000 population for males and 97.2 for females). Furthermore, for men ages 15-44, injury ranked first in regards to hospitalizations, accounting for 20% of their total hospital admissions (Capital Health, 1997). This contribution of injury to men's health problems is substantial when one considers the use of physician services for this problem and visits to emergency rooms (Capital Health, 1997). Lastly, according to 1996 statistics, males out number females in injury deaths. When taken together, injury and suicide were the only major causes of death in young men between 15-24 years of age. They account for 80.5% of the 41 deaths in this

age group with suicide contributing 36.6% and injury making up 43.9% (Capital Health, 1997). As is the picture with young men, injury and suicide were the only major causes of death in women of the same age group. They account for 68% of the 19 deaths in this age group (Capital Health, 1997). If suicide and injury deaths were prevented, there would be very few men and women of this age who died. PYLL is often used to emphasize deaths at a young age. The PYLL due to injury/suicide for this age group was 1,610 years or 21.5 lifetimes (using 75 years as the average lifetime) for men, and 724 years or 9.6 lifetimes for women (Capital Health, 1997). Injury also continued to be the leading cause of death accounting for almost half (49.2%) of the 191 deaths to men and for 38.6% of the 135 deaths to women in the 25-44 age group (Capital Health, 1997). For men, suicide alone contributes to 20.4% of the deaths and injury contributes 28.8% (Capital Health, 1997). For women, injury and suicide were evenly split with each contributing half of the deaths. Overall, these mortality trends were similar to those at the provincial level (ACICR, 1998; Alberta Municipal Affairs, 1995-97).

Table A3.1 – Age Standardized Death Rates (per 100,000) for Leading Causes of Death in the Capital Health Region, 1996

Cause of Death	Male Rate	Female Rate	Total Rate
Heart Disease	168.6	130.0	147.8
Cancer	159.5	143.7	150.6
Injury (including Suicide)	**82.4**	**45.1**	**63.4**
Stroke	36.7	43.9	40.1
COPD	28.5	21.8	24.8
Pneumonia/Influenza	20.4	16.9	18.4

Source: Health Status in the Capital Health Region: A Technical Report, 1997.

Table A3.2 – Potential Years of Life Lost (PYLL) from Leading Causes of Death, 1996

Cause of Death	# Deaths	% Deaths	PYLL	% PYLL	Lifetimes Lost
Cancer	1,174	27.7%	10,265	26.0%	136.9
Heart Disease	1,148	27.7%	5,874	14.9%	78.3
Stroke	311	7.3%	1,252	3.2%	16.7
COPD	192	4.5%	684	1.7%	9.1
Pneumonia/Influenza	143	3.4%	534	1.4%	7.1
Injury (includes suicide, poisoning and burns)	488	11.5%	**15,153**	**38.4%**	202.2

Source: Health Status in the Capital Health Region: A Technical Report, 1997

Appendix IV

CONSENT FORM

(To be completed by research participant)

Title of Project:	Analysis, Design and Development of a Sustainable Community Fire Station-Based Injury Control and Research Centre
Principle Investigator:	Louis Hugo Francescutti, MD, PhD, MPH
Co-investigators:	John A. Sharma, BSc Francis Lau, PhD Peter J. Rothe, PhD

You are being invited to participate in a research project conducted by John A. Sharma, a graduate student in the University of Alberta's Department of Public Health Sciences. This project is under the direction of Assistant Professor Louis Hugo Francescutti, Department of Public Health Sciences, Epidemiology Program.

You are invited to participate in a research study about the activities and processes involved in the analysis, design and development of a sustainable community-based injury control and research center that is uniquely housed in a fire station.

You will be interviewed about your involvement in the Centre's analysis, design and development. Also, you will be asked some questions pertaining to your views on injury. The interview will take between 45 – 90 minutes of your time. The interview will occur at a convenient time and place.

There may not be direct benefits to you for being in this study. However, it is expected that once the study is complete, the results will assist other communities to establish their own infrastructure (i.e., centers) for injury control and research.

There are no possible risks involved in this study.

Should you decide to participate in this study, please understand that your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time. You have the right to refuse to answer any question(s) for any reason.

In addition, the researcher will cleanse actual quotes from identifiable information and take great care to maintain complete anonymity, but because of the small number of interviews, someone in the field (i.e.,EMS) *may* be able to identify you. Consequently, if you require, the researchers are prepared to provide you with the quote(s) used in order to maintain an interactive and participatory stance with all interviewees. Finally, after the successful completion of the study, all the audio tape-recorded information you have provided during the interview will be erased.

A signed copy of this consent form will be provided to the you, the participant, within 3 business days.

If you have any questions about this project, please feel free to contact either myself, John Sharma, at (780) 464-8468, or my supervisor, Dr. Louis H. Francescutti, at (780) 492-6546.

****

I, _____, have read and understood the information above. Any questions I have asked have been answered to my satisfaction. I voluntarily consent to participate in the research project entitled "**Analysis, Design and Development of a Sustainable Community Fire Station-Based Injury Control and Research Centre**" and know that I may change my mind and stop at any time.

I understand that all information provided is treated as confidential and will not be released by the investigator(s) unless required to do so by law.

I agree that the research data gathered for this study may be published provided my name is not used.

_____ _____

Signature of Participant Date

_____ _____

Signature of Investigator Date

_____

Name of Investigator (Printed)

Appendix V

Contact/Encounter No.:_____
[Number Consecutively]
Date:_____

CONTACT OR ENCOUNTER FORM

Type of Contact

Telephone ☐
Personal Meeting ☐
Electronic Mail ☐
Other (*Specify*) ☐

_____

Who Initiated Contact?

Centre Staff ☐
Other (*Specify*) ☐

_____

Purpose of Contact

Request for Volunteer Support ☐
Request to do Presentation ☐
Request for Data/Statistics ☐
Request for Injury Information ☐
Request to Participate in Program ☐
Request for Other Support ☐
Offer of Volunteer Services ☐
Other (*Specify*) ☐

_____

Other Assistance Provided

Information Only ☐
Materials ☐
Consultation ☐
Training ☐
Other (*Specify*) ☐

_____

Other Information

_____
_____
_____
_____

Appendix VI

Problems with Unlinked Data

The Alberta Injury Data Report (Injury Prevention Centre, 1994) on Motor Vehicles recorded 338 deaths and 4,173 injuries due to motor vehicle collisions. However, another data source, the Alberta Collision Information System (ACIS), recorded 395 deaths and 20,169 motor vehicle injuries in 1994. Upon further analysis, the obvious discrepancy in the data requires a couple of things to be considered when comparing these injury databases. ACIS data comes from police reports, and data is effective as of the day of the collision. On the other hand, Alberta Injury Data Report sources are Vital Statistics (Deaths) and Alberta Health (Inpatient Hospitalizations), and inpatient data is collected based on discharge from hospital. For instance, if someone was injured in a motor vehicle collision on December 31, 1994, and they were not discharged from the hospital until January 4, 1995, they would not be included in 1994 data but rather in the 1995 database. Also, the Alberta Injury Data Report is based on Albertans living in the province of Alberta and therefore, does not take into account the vacationers who may have been killed or injured on Alberta roadways. It is not only necessary to have knowledge of those data sources that are used immediately, but also those that may become useful either to the RICRC or a community partner in the future. Because only overall trends in all injury categories were examined, particular areas such as childhood injuries were not a focus, but knowledge of existing childhood injury databases was. When comparing the Alberta Injury Data Report to the Canadian Hospitals Injury Reporting and Prevention Program (CHIRRP), consideration needs to be given to the fact that CHIRRP only collects emergency room data on children who are treated in 10 specified children's hospitals across Canada. Although CHIRRP collects excellent data on circumstances surrounding injury it does not collect the entire population of children and their emergency room visits nation-wide. For example, in Alberta, only those patients seen in emergency rooms at Alberta Children's Hospital are captured therefore not accounting for all the emergency room visits for children in all other hospitals across the rest of the province.

Because of the difficulty in obtaining comprehensive injury data, some overall considerations need to be made. For example, data sources were found not to be linked by a unique identifier and therefore it is not particularly wise to try and compare data across databases. It is important to consider the variables when looking at data sets, the time period the data is collected, and the criteria on which the data is based (i.e., admit date, discharge date, date case was closed, date of injury etc.). If a comparison is being made to other communities around the nation, it is important to remember that there are no mandatory standard injury groupings across provinces. For this reason, it is important to consider the manner in which data is grouped or collected (i.e., are E-codes or other methods used?). If E-codes are used, careful attention is needed as to which E-code is chosen if multiple E-codes are recorded (e.g. motor vehicle collision in which driver is thrown from car and drowns). Also, consideration to recording of ages is needed so that when using ages, it is the age of the patient at the time of injury. For example, if the age used was the discharge age and not the admit age, this could move a patient out of the childhood grouping and into the adult grouping (i.e., if a patient is severely injured and is spending a year of more in hospital).

Appendix VII

ICI Model Collaborators

The following were identified as the ICI Model participants:

- *Employers* (i.e., industry)- such as the Strathcona Industrial Association (SIA). The SIA is an association of ten companies operating heavy industrial facilities in Strathcona County and the eastern portion of the City of Edmonton. The Association, established in 1974, has a mandate to work with the community to ensure a safe and healthy living environment. Endorsed by the SIA in 1987, came the concept of Community Awareness and Emergency Response (CAER) to advise the community of potential hazards and to have an emergency plan and ensure it is integrated with the community response plan. Such employers are finding that it is good business to institute safety programs in the workplace because effective habits instilled at work transfer to employees at home, to their families, and to the community as a whole (e.g., CAER group's Partners in Injury Reduction safety audit workshop described later).

- *Health Care Providers*- such as the County's Health Unit can become safety advocates with patients by taking time to talk about injury prevention and by taking advantage of "teachable moments" when the injured are more susceptible to adopting improved health lifestyle behaviors.

- *Community and Civic Groups*- such as the Safe Community Coalition of Strathcona County and the Parents Against Impaired Driving (PAID) group, rarely have the financial resources to achieve goals by themselves, but by forming partnerships with other groups with common goals, enthusiasm can be translated into concrete accomplishments.

- *Law enforcement*- based on the data they collect, these agencies can identify specific problems, such as traffic safety, that would benefit from increased enforcement or increased education campaigns.

- *Emergency Medical and Fire Services*- they enjoy a high level of public confidence and can teach simple steps citizens can take to help in an emergency, such as the CPR and First Aid taught by the Prevention Education personnel in the County of Strathcona.

- *Local Government*- County of Strathcona Council are important in providing the "political support" that gives public exposure to preventive efforts, highlights the community effort at higher government levels, and facilitates any regulatory or legislative actions.

Appendix VIII

Personal Interview Questions

ANALYSIS PHASE

What was your reason for being a part of the establishment process for the center?

Was there in fact a need for this injury control center? Why or why not?

What was the ultimate goal you saw of this injury control center?

DESIGN PHASE

Why do you think Strathcona County was chosen as the pilot site? And why a fire station?

How do you think the EMS role will change with the centers' presence?

What did you see the center doing after one year of operation?

DEVELOPMENT PHASE

What was your role or responsibility during the development of this community based center?

What were the pros and cons during this development period? What would you have done differently?

What were the initial barriers to creating an injury control center?

What concerned people about establishing such a center?

Other than those involved with obtaining budgetary support, who else was involved in providing overall support to the center (i.e. agencies, coalitions, community groups, corporate organizations etc.)?

Were people supportive of the idea from the beginning? How did their support change? If so, why?

Who were the main people involved in obtaining budgetary support for the injury control center?

How did these people first come together?

What steps did they take to start getting a budget?

What were some of the competing budgetary demands that had to be addressed?

How did you begin the process of obtaining funding? What would you do differently next time?

What have you learned so far about how to obtain budgetary support for injury projects such as the injury control center?

How did you go about getting their support? What would you have done differently?
Who have you found to be most important in helping to make the injury control center a permanent fixture in the community?

Of all the steps you took, which would you say were the most valuable in moving you toward developing an injury control center?

What would you tell other researchers/community groups/health professionals to be sure to do when they attempt to develop an injury control center?

Appendix IX

1998/99 RICRC Business Plan- Executive Summary

Injuries are the leading cause of death for Albertans aged 1 to 44 and account for more potential years of life lost than any other disease in Alberta. A mandate has been given to the Alberta Centre for Injury Control and Research (ACICR) by Alberta Health to consolidate and strengthen injury control initiatives in Alberta. Therefore, to help address this significant health problem at the community level, the Regional Injury Control and Research Centre (RICRC) has been created and will act as the first official satellite center of the ACICR. This business plan has been prepared to set a clear direction for RICRC to carry its own injury control initiatives in the Region while at the same time contributing to the ACICR in carrying out their mandate. Furthermore, this business plan will also give RICRC direction to involving and informing key stakeholders including government departments, non-government organizations, the corporate sector, and other key stakeholders. Ultimately, this business plan will aid in meeting the planning requirements of the funders, Alberta Municipal Affairs, County of Strathcona, and town of Fort Saskatchewan.

The vision of the Regional Injury Control and Research Centre is to "*make Alberta Communities the safest communities in Canada to travel, live, play and work in*". To achieve this vision, the RICRC's mission is to *provide leadership and a supportive infrastructure in injury control and prevention at the community level so as to eventually reduce the incidence and severity of injuries occurring in the region.*

The RICRC will need to be developed in an effective manner so as to address the full continuum of injury control - from prevention, through emergency medical services, to acute care of the injured individual, to rehabilitation and reintegration of the individual in society. Research indicates that injury control can improve the population-weighted quality of life more than any other behavioral intervention.

Close working relationships will be developed, maintained and enhanced with stakeholders and partners from a variety of sectors to ensure a comprehensive and coordinated approach is taken to reduce and manage intentional and unintentional injuries in the Region. Using an epidemiological approach, backed by up-to-the-minute injury surveillance data (Data-Driven Approach), and using multi-faceted approaches involving education, engineering and enforcement, the RICRC will eventually offer leadership and support for injury control initiatives in the areas of programming; research, surveillance, and evaluation; information sharing; and education.

The Centre is hosted and sustained by the Strathcona County Emergency Services (SCES) Department and is guided by the Centre Coordinator. The above funders have made a one-year funding commitment for the start-up/establishment of the RICRC. To ensure that the Centre is sustained and that injury control initiatives as dictated by the community and the ACICR are implemented and evaluated, future funding will be sought. This initial funding commitment to injury control in the Region will create a starting point to reduce the frequency and severity of injuries and their overall burden in Alberta.

Appendix X

STAGE 1 INJURY CONTROL AND RESEARCH CENTRE ESTABLISHMENT PROTOCOLS

PROTOCOL A:

1. Have you identified/acknowledged that injuries are a problem in your community?

   - **YES**. Go to 2.
   - **NO**. Perform community needs assessment and develop community profile.

2. Does the community require the dedicated infrastructure to address the problem of injuries?

   - **YES**. Establish a community-based Injury Control and Research Centre. Initiate ***PROTOCOL B***.
   - **NO**. Choose alternative course of action to meet community needs in regards to the injury problem.

PROTOCOL B (10 Step Set-up Process):

1. Market injury control (not just prevention) to local and provincial government, and community safety stakeholders.

2. Find a suitable location to house Centre. Location should also help to ensure sustainability. (Resource dependent variable)

3. Apply for and obtain funding from sources such as local and provincial government, industry, community agencies and groups, and research organizations.

4. Find knowledgeable and appropriately trained individual and staff to coordinate Centre activities. (Resource dependent variable)

5. Develop business plan. Establish long-term goals and objectives to guide daily Centre activities/operations.

6. Purchase necessary office equipment for daily activities. (Resource dependent variable)

7. Mobilize resources (e.g. Individuals, government, community groups and organizations etc.). Develop a model to streamline collaborative process for health and safety initiatives.

8. Obtain or develop necessary injury surveillance tool (s). Identify potential data sources. Establish database for injury data collection and analysis.

9. Identify existing community safety initiatives in order to minimize duplication of activity; thereby, aiming to strengthen injury control in the community. Disseminate this information to community injury control stakeholders.

10. Identify and build rapport with local media. Inform community of key injury control messages (i.e., educate public to raise awareness).

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